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PRESENTATION OF NEDS EMISSION DATA FOR AIR POLLUTION STUDIES

Richard C. Haws

Research Triangle Institute
Durham, North Carolina

November 1974

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PRESENTATION OF NEDS EMISSION DATA FOR AIR POLLUTION STUDIES

by

Richard C. Haws

Research Triangle Institute
Research Triangle Park, N. C. 27709

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Office of Air Quality Planning and Standards
Research Triangle Park, N. C. 27711

November 1974

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16. ABSTRACT

The National Air Data Branch (NADB) has the responsibility to gather source emission, air quality, and related information from 55 states and territories into a single nation air data management information system.

The purpose of this report is to provide researchers in the field of criteria air pollutant emissions with a background of what data are available in NEDS, both in edited form and in summaries, and what types of summaries and analyses are included with short discussions of the method of preparation of each and some of the required and/or optional input parameters associated with each.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
NEDS Emissions Modeling		

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INTRODUCTION

The National Air Data Branch (NADB) is functionally a part of Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards of the Environmental Protection Agency. This organization has the responsibility to gather source emission, air quality, and related information from 55 states and territories into a single national air data management information system at one location under one administrative body. The Branch's activities include management of air quality emissions data in the National Emissions Data System (NEDS) and the Storage and Retrieval of Aerometric Data (SAROAD) systems collectively referred to as the Aerometric and Emissions Reporting System (AEROS). The information provided by these systems is utilized by EPA management in decision-making processes involving evaluation of trends in air quality and emissions and subsequent development of control strategies, and for assessing economic effects and cost/effectiveness of proposed and promulgated control legislation, regulations, and abatement alternatives.

Emissions information for more than 75,000 point sources is collected and analyzed by NEDS. This system also handles area sources and other related information necessary for emission inventories and to reflect federal reporting requirements.

NADB also has the capability to access information gathered under the EPA Compliance Data Systems (CDS), Hazardous Air Pollutant Enforcement Management System (HAPEMS), and Comprehensive Data Handling System (CDHS).

The emissions and source inventory data bank (in NEDS) was established in early 1972. Contributors to the data bank are primarily the U.S. Environmental Protection Agency and other Federal, State, and local agencies; and to a small extent, private groups and institutions. The normal flow of domestic data is from State and local agencies to EPA Regional Offices and then to the NADB. Data are validated and authenticated preparatory to storage in the data bank.

Through the use of NEDS the Branch produces (1) semiannual emission reports to the Administrator of EPA and for publication, (2) data and summary printouts to the contributing agencies, (3) reports on analyses of particular data of interest, (4) responses to special requests, and (5) information used as input to air quality simulation models.

The purpose of this presentation is to provide researchers in the field of criteria air pollutant emissions with a background of what data are available in NEDS, both in edited form and in summaries, and what types of summaries and analyses are included with short discussions of the method of preparation of each and some of the required and/or optional input parameters associated with each.

It is important to note that this presentation is neither exhaustive nor complete. That is, only a brief description of each item is included; recourse to cited documents or to NADB is recommended for further information. Also, this presentation is incomplete with regards to the availability of either data, summaries, or analyses. The NEDS data base is frequently updated to include (a) new or existing but previously unidentified emission sources; (b) additions or corrections to existing emission sources (this includes achievement of a compliance schedule milestone); (c) new emission sources moving from planned to active status;

(d) existing emission sources which cease operation; and (e) new sources in the planning/construction/startup phases. Furthermore, new summary and analysis procedures are continually being prepared and old ones are revised as new user needs are identified. NADB would be pleased to receive requests for its services and solicits ideas on improving the effectiveness and usefulness of NEDS.

RETRIEVAL OF NEDS DATA

The NEDS currently includes identifying data and criteria pollutant emissions values for each of over 75,000 point sources as well as emissions and location data for about 3,200 "area sources" (counties, etc.). What follows in this section is a discussion of the products of the retrieval programs currently available in NEDS. As noted previously, this is not necessarily a complete list, since NEDS is continually being added to and modified.

The basic retrieval program for the "general user" produces the standard format listings which display all relevant descriptive and identifying data as well as estimated and NEDS calculated emissions, for each criteria pollutant. Computer output on each page consists of data for each process emission source or two county area source entries. The interested user is encouraged to refer to APTD 1135, "Guide for Compiling a Comprehensive Emission Inventory," for a detailed description of source emission data requirements. This reference will soon be entirely superseded by the AEROS manual.

In addition to standard-format complete point and area source listings, abbreviated listings identifying point sources can be produced which display emission-related characteristics and annual emissions for

each of the five criteria pollutants (Particulates, Sulfur Oxides, Oxides of Nitrogen, Hydrocarbons, and Carbon Monoxide). These listings are available with the following parameters for selection:

1. AQCR, county, state, EPA region, nationwide; multiple AQCR's, states, or counties may be requested for a single run.

2. Ownership (private, Federal Government, local government, utility, or all).

3. Minimum requested value of emission in tons/year for any one pollutant (≥ 0).

4. Source Classification Code (SCC), (at any of the four classification levels which are essentially process descriptors).

5. Inclusion or exclusion of confidential data.

6. Standard Industrial Classification (SIC) code.

7. Emission estimation method.

The selected data can then be sorted in ascending (A) or descending (D) sequence for any of the following data values:

1. State (A)

2. County (A)

3. Plant Number (A)

4. Point Number (A)

5. Source Classification Code (A)

6. Ownership (Federal, local government, utility, or all) (A)

7. Standard Industrial Classification (SIC) Code (A)

8. Emission Estimation Method (A)

9. AQCR (A)

10. Plant Name (A)

11. Amount of emissions for any one of the five criteria pollutants (A)

12. Year of Record (A)

13. Control equipment (A)

14. Control Efficiency (D)

15. Fuel Sulfur Content (D)

16. Fuel Ash Content (D)

17. Major City Code (A)

18. UTM Coordinates (D)

19. Operating Rate (D)

20. Confidentiality (A)

Both of these lists are expanding as users' needs expand.

DATA SUMMARIES

Because of the large amount of data in the NEDB, many users find it desirable, and entirely adequate for their needs, to have one or more summaries of the emissions data contained in the data base. NEDS has several summaries available, of which the Emissions Report and "Fuel Use Report" are frequently used.

One example page of condensed point source listings selected by: minimum acceptable emission value = 0 and AQCR = 70, and sorted by SCC Code, is shown in Figure 1. An example page selected by the same criteria and sorted by particulates emission values is shown in Figure 2.

Total emissions by pollutant for the five criteria pollutants selected by total U.S., EPA region, state, AQCR, state portion of inter-state AQCR's, and county are available in summary form. Examples are presented in Figure 3 by county and in Figure 4 by AQCR as sub-totals at Levels I, II, and/or III of the SCC for point sources and corresponding area source sub-totals.

Total fuels used by fuel-consuming stationary source categories are also available in summary by total U.S., state, county or AQCR. Examples are presented in Figure 5 by county and Figure 6 by AQCR, for AQCR 70.

Additional summaries are available, and more summaries are added as user needs dictate. Please contact the National Air Data Branch for more information and assistance with any particular needs.

THE WEIGHTED STATISTICAL ANALYSIS PROGRAM (WSAP)

The purpose of this program is to identify analytically the NEDS emissions source categories which require the most accurate and complete data in order for NEDS to maintain an overall level of accuracy in total emissions reported. It also calculates the accuracy required of each of the sub-categories and elemental categories in order to meet an overall accuracy level (specified by the user of WSAP).

Input parameter requirements are: the AQCR, state, or county desired, and the desired confidence level (maximum permissible percentage error in total emissions) for each of the five criteria pollutants (variables designated as THETA's in the program output). The appropriate emissions report values for each pollutant in the summary are used as data. The program then calculates allowable errors for each pollutant by magnitude and percentage for all entries in each succeeding level of the "tree" of emissions. The algorithm used is the standard linear statistical model, in which (a) the sum of the partial emission ($\bar{\tau}_i$) equals the total emissions, ($\bar{\tau}_T$), (b) the total allowable error (σ_T) is THETA times the total emission (τ_T), (c) the sum of the variances (σ_2^2) of the partial emissions is equal to the variance (σ_T^2) of the total emissions and (d) the variances (σ_2^2) of the partial emissions are proportional to (weighted by the partial emission ($\bar{\tau}_i$). Mathematically,

(a) $$\bar{\tau}_T = \sum_i \bar{\tau}_i$$

(b) $$\sigma_T = \theta \bar{\tau}_T$$

(c) $$\sigma_T^2 = \sum_i \sigma_i^2$$

(d) $$\frac{\sigma_i^2}{\bar{\tau}_i} = \frac{\sigma_i^2}{\bar{\tau}_T} \quad \text{for all } i.$$

The σ's calculated at each "tree" level are used to derive THETA's for the next detailed level of calculation until all elementary categories in the emissions report summary have been assigned their THETA's.

A sample of two neighboring levels of iteration from the report for AQCR 70 (Metropolitan St. Louis Interstate) is shown in Figure 7.

GRAPHICAL PRESENTATION OF NEDS DATA

It is often useful to condense large amounts of data into a graphical format. Consider as examples the graphs presented as Figures 8-17. All were drawn from the data sampled in Figure 2 and the corresponding listings for AQCR 070 for the other four criteria pollutants. Figures 8-12 show that, generally, a significant number of large point sources exist for the criteria pollutants, but that the number of sources rises rapidly as the amount emitted per source decreases. The one exception in these examples is hydrocarbons, in that very few large sources exist. Figures 13-17 display the same data in a different format; they show that 75% or more of point source emissions are caused by the 10 largest emitters for each pollutant except hydrocarbons. With hydrocarbons,

approximately 80 sources produce 75% of the point source emissions. Thus, for the non-hydrocarbon point sources a significant percentage of total emissions can be attributed to very few sources. Correspondingly for hydrocarbon emissions a much larger percentage of sources is needed to accumulate a similar percentage of total emissions.

GRIDDING AND EMISSION APPORTIONING FOR COUNTIES AND EMISSION DENSITIES

What has been presented in detail thus far has dealt with point source emissions. Point sources are generally defined as stationary emission sources emitting 100 tons or more per year of at least one criteria pollutant. The remainder of identifiable sources include mobile sources and "small" stationary sources and are classed as area sources. They are large in number, however, and usually contribute significantly to total emissions of criteria pollutants, especially in urban and suburban areas. In the area source emission methodology area-wide fuel totals are used. If large point sources are not included in the point source listing they are included in the area source total. As the point source inventory is improved and more sources under 100 tons per year are included, the area source emissions will correspondingly decrease. Area sources are included in NEDS as measures of inputs to emission production in a geographic area (such as a county) for various economic categories, such as type of fuel used by use category; for example, residential heating with fuel oil or heavy-duty vehicle use of diesel fuel. If the user wishes to model air quality, say, using a dispersion modeling technique such as the Implementation Planning Program (IPP), over an area which includes only one or a few area sources (one NEDS record for each area source), it is necessary, for adequate

definition in the model, to apportion the area source emissions into geographically smaller sources which are treated as "virtual" point sources by the IPP model. Gridding of the total area being modeled into smaller areas and the apportioning of the total area source emissions to the smaller resultant grid areas is essentially what is required in this case; what follows is a description of one such technique and its usefulness in the graphical display of emissions for a geographic area or political jurisdiction.

The Computer Assisted Area Source Emissions (CAASE) gridding system of programs provides the user with assistance in gridding a county and apportioning area source emissions to the grid squares preliminary to modeling the area with a dispersion model such as the Implementation Planning Program (IPP). A complete description of the program and the CAASE technique is included in the "Computer Assisted Area Source Emissions (CAASE) User's Guide" (EPA-450/3-74-035). The NEDS area source record for the City of St. Louis, Mo., in AQCR 070 is shown in Figure 18. In the IPP, each grid square is treated as a virtual point source, and specific point sources are also modeled to provide a total annual mean air quality display. If care is used in the gridding process, several counties may be combined into a larger unit such as an AQCR if desired. Primary outputs from the CAASE system include IPP area source input cards; a sample listing of these cards is shown in Figure 19.

Since the gridding process applied to AQCR 070 produced a large number of area sources (AQCR 070 is a large-area, densely-populated region), it is useful to provide some form of graphical display to compactly characterize the AQCR's emissions pattern. For example, an

"emission density" (emission/unit area) plot can display the relative concentration pattern of emissions associated with the area, assuming that the apportioning techniques are appropriate. Accordingly, rank-ordered listings of area source emission/unit area for all grid squares for each criteria pollutant were prepared. Graphs of cumulative percent of emissions from area sources versus percent of contained area for each criteria pollutant were produced from these listings and are presented as Figures 20-24.

An examination of the graphs shows that, while the apportioning algorithms are different for different pollutants (the graphs are not identical), they are roughly equivalent in overall distribution of emissions. For example, all five pollutants have 80% of total emissions coming from between six and eight percent of the total AQCR area, and all plots are very similar in overall shape. How much difference really exists, however, would have to be determined by a more detailed analysis, such as a cross correlation of grid square number versus rank-ordered cumulative percent emissions or rank-ordered fractional emission density.

One can combine area and point source emissions for each criteria pollutant within each grid square, using the grid and apportioned emissions outputs from the CAASE system and NEDS point source data. These were produced as rank-ordered listings of emission density (emissions/sq. km) per grid square for each of the criteria pollutants, and associated total emissions for each grid square. A plotter display was also produced of the grid showing emission density for each grid square on a scale of 1-5; plotter displays of the gridded area were produced for each criteria pollutant separately. The plotter displays for each criteria pollutant are presented as Figures 25 to 29.

One can produce a listing of each grid square's emissions by criteria pollutant in descending order by emission density within the grid square, and a listing of point source location by point source number and grid square number, and a list of transferred point sources (if any). "Transferred point sources" refers to those point sources for which UTM coordinates have been recalculated when the gridded area spans more than one UTM zone. Examples are shown as Figures 30-32, respectively, using data from AQCR 070.

SUMMARY

In order to adequately and timely serve the requirements of the Environmental Protection Agency, the National Emissions Data System has been created by the National Air Data Branch. The more than 75,000 point source entries and roughly 3,200 area source entries are stored in NEDS, which is maintained and retrieved by NADB. This includes a growing system of user-oriented retrieval packages.

Retrieval packages include the standard format point and area source listings, abbreviated point-source listings, summary totals and sub-totals at Levels I, II, and III of the SCC code for point sources and corresponding area source sub-totals, and the Weighted Statistical Analysis.

Graphical presentations of retrieved data, which permit rapid and sometimes novel analyses of the characteristics of large amounts of data such as in NEDS, are often useful. The presentation here includes number of point sources versus annual emissions and cumulative percent of annual emissions versus number of sources, both produced from the abbreviated point source listings sorted in descending order by annual emissions; the emission density plots for area source emissions produced from area source grids; and the cumulative percent of emissions from area sources versus percent of contained area in which the emissions occur.

APPENDIX

(ALL FIGURES)

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FILE CREATED ON WEDNESDAY DECEMBER 19, 1973

NATIONAL EMISSION DATA SYSTEM

CONDENSED POINT SOURCE LISTING FOR PARTICULATE
FOR ALL VALUES > THAN OR = TC 0
EMISSIONS ARE IN SHORT TONS PER YEAR

			PART	SOX	NOX	HC	CO
0001: P.P.G.-GLASS, CRYSTAL CITY, MO.		OWNERSHIP: PRIVATE	188	1,070	98	2	56
26: MISSOURI 2280: JEFFERSON		YEAR OF RECORD: 1970					
070: METROPOLITAN ST. LOUIS (ILL-MO)							
00C: NO CONTROL EQUIPMENT		EFF = % POINT: 01					
ESTIMATE BY (3) USED EMISSIONS FACTORS	SIC = 3211	SCC = 1-01-001-02					
0010: UNION ELEC 8200 FINE RD. MERAMEC PLANT		OWNERSHIP: UTILITY	466	6,840	4,590	46	153
26: MISSOURI 4300: ST LOUIS		YEAR OF RECORD: 1970					
070: METROPOLITAN ST. LOUIS (ILL-MO)							
010: ELECTROSTATIC PRECIPITOR - HIGH EFFICIENCY		EFF = 98.0% POINT: 02					
ESTIMATE BY (3) USED EMISSIONS FACTORS	SIC = 4911	SCC = 1-01-002-01					
0003: UNION ELECTRIC CO,HIGHWAY M.,LABADIE		OWNERSHIP: UTILITY	209	37,300	9,570	96	319
26: MISSOURI 1680: FRANKLIN		YEAR OF RECORD: 1972					
070: METROPOLITAN ST. LOUIS (ILL-MO)							
010: ELECTROSTATIC PRECIPITOR - HIGH EFFICIENCY		EFF = 99.5% POINT: 03					
ESTIMATE BY (3) USED EMISSIONS FACTORS	SIC = 4911	SCC = 1-01-002-01					
0038: UNION ELEC ASHLEY POWER STATION		OWNERSHIP: UTILITY	1	23	14	<1	<1
26: MISSOURI 4800: ST. LOUIS CITY		YEAR OF RECORD: 1972					
070: METROPOLITAN ST. LOUIS (ILL-MO)							
ELECTROSTA PITOR - MEDIUM EFFICIENCY		EFF = 97 POINT: 01					
ATE BY SIONS FACT	SIC = 4911	SCC -01)					
GHWA		ILIT					

Figure 1. Condensed Point Source Listing Sorted by Source Classification Code (SCC)

FILE CREATED ON WEDNESDAY DECEMBER 19, 1973

NATIONAL EMISSION DATA SYSTEM

CONDENSED POINT SOURCE LISTING FOR PARTICULATE
FOR ALL VALUES > THAN OR = TO 0
EMISSIONS ARE IN SHORT TONS PER YEAR

			PART	SOX	NOX	HC	CO
0009: GRANITE CITY STEEL,GRANITE CITY	62041	OWNERSHIP: PRIVATE	84,300				13,400
14: ILLINOIS 4680: MADISON		YEAR OF RECORD: 1972					
070: METROPOLITAN ST. LOUIS (ILL-MO)							
: NO CONTROL EQUIPMENT		EFF = % POINT: 06					
ESTIMATE BY ( ) CODE NOT APPLICABLE	SIC = 3312	SCC = 3-03-008-01					
0009: GRANITE CITY STEEL,GRANITE CITY	62041	OWNERSHIP: PRIVATE	72,300				11,500
14: ILLINOIS 4680: MADISON		YEAR OF RECORD: 1972					
070: METROPOLITAN ST. LOUIS (ILL-MO)							
: NO CONTROL EQUIPMENT		EFF = % POINT: 05					
ESTIMATE BY ( ) CODE NOT APPLICABLE	SIC = 3312	SCC = 3-03-008-01					
0009: GRANITE CITY STEEL,GRANITE CITY	62041	OWNERSHIP: PRIVATE	26,800				73,100
14: ILLINOIS 4680: MADISON		YEAR OF RECORD: 1972					
070: METROPOLITAN ST. LOUIS (ILL-MO)							
: NO CONTROL EQUIPMENT		EFF = % POINT: 11					
ESTIMATE BY ( ) CODE NOT APPLICABLE	SIC = 3312	SCC = 3-03-009-03					
0009: GRANITE CITY STEEL,GRANITE CITY	62041	OWNERSHIP: PRIVATE	26,800				73,100
14: ILLINOIS 4680: MADISON		YEAR OF RECORD: 1972					
070: METROPOLITAN ST. LOUIS (ILL-MO)							
NO CONTRO NT		EFF = % POINT: 10					
ATE BY APPLICAB	SIC = 3312	SCC 09-03					
STA 24		TILITY					

Figure 2. Condensed Point Source Listing Sorted by Particulate Emission Values

NATIONAL EMISSIONS DATA SYSTEM

ENVIRONMENTAL PROTECTION AGENCY

COUNTY EMISSIONS REPORT

BOND COUNTY, ILLINOIS

RUN DATE: JANUARY 26, 1974
EMISSIONS AS OF: DECEMBER 19, 1973

	PARTICULATES TONS / YR	SOX TONS / YR	NOX TONS / YR	HC TONS / YR	CO TONS / YR
FUEL COMBUSTION					
EXTERNAL COMBUSTION					
RESIDENTIAL FUEL (AREA)					
BITUMINOUS COAL	55	294	8	55	248
DISTILLATE OIL	12	67	14	4	6
NATURAL GAS	3	0	7	1	3
WOOD	2	0	1	0	0
TOTAL (RESIDENTIAL)	72	361	31	60	257
INDUSTRIAL FUEL					
BITUMINOUS COAL AREA SOURCES	37	38	5	0	1
RESIDUAL OIL AREA SOURCES	0	2	1	0	0
DISTILLATE OIL AREA SOURCES	0	1	1	0	0
NATURAL GAS AREA SOURCES	1	0	5	1	0
TOTAL (INDUSTRIAL) AREA SOURCES	38	41	13	2	1
COMM-INSTITUTIONAL FUEL					
RESIDUAL OIL AREA SOURCES	9	60	23	1	0
NATURAL GAS AREA SOURCES	2	0	8	1	2
TOTAL (COMM-INST) AREA SOURCES	10	60	31	2	2
TOTAL (EXTERNAL COMB) AREA SOURCES	121	462	75	64	260
TOTAL (FUEL COMBUSTION)					
AREA SOURCES	121	462	75	64	260

Figure 3. County Emissions Report

SOLID WASTE DISPOSAL					
**********					
RESIDENTIAL (AREA)					
ON SITE INCINERATION	51	1	2	170	511
OPEN BURNING	21	1	8	44	110
TOTAL (RESIDENTIAL)	72	2	10	215	622
COMMERCIAL-INSTITUTIONAL					
ON SITE INCINERATION					
AREA SOURCES	7	1	1	5	11
OPEN BURNING					
AREA SOURCES	7	0	3	15	38
TOTAL (COMM-INST)					
AREA SOURCES	14	1	4	21	49
INDUSTRIAL					
ON SITE INCINERATION					
AREA SOURCES	32	4	5	27	54
OPEN BURNING					
AREA SOURCES	9	1	3	19	47
TOTAL (INDUSTRIAL)					
AREA SOURCES	41	5	9	46	101
TOTAL (SOLID WASTE DISP)					
AREA SOURCES	127	8	22	281	772
TRANSPORTATION (AREA)					
**********					
LAND VEHICLES					
GASOLINE					
LIGHT VEHICLES	42	25	605	1211	6137
HEAVY VEHICLES	5	3	165	310	1222
OFF HIGHWAY	5	3	106	335	1833
TOTAL (GASOLINE)	52	31	877	1855	9193
DIESEL					
HEAVY VEHICLES	7	14	198	20	117
OFF HIGHWAY	0	1	9	1	6
RAIL	1	2	3	2	2
TOTAL (DIESEL)	8	17	210	23	125
GAS HANDLING EVAP LOSS	0	0	0	134	0
TOTAL (TRANSPORTATION)	60	48	1087	2012	9318
MISCELLANEOUS (AREA)					
**********					
SOLVENT EVAPORATION LOSS	0	0	0	40	0
TOTAL (MISCELLANEOUS)	0	0	0	40	0
GRAND TOTAL					
**********					
AREA SOURCES	308	518	1184	2397	10350
TOTAL	308	518	1184	2397	10350

Figure 3. (Continued)

NATIONAL EMISSIONS DATA SYSTEM

ENVIRONMENTAL PROTECTION AGENCY

AQCR EMISSIONS REPORT

RUN DATE: JANUARY 26, 1974
EMISSIONS AS OF: DECEMBER 19, 1973

AQCR 070 METROPOLITAN ST. LOUIS (ILL-MO)

	PARTICULATES	SOX	NOX	HC	CO
	TONS / YR	TONS / YR	TONS / YR	TONS / YR	TONS / YR
FUEL COMBUSTION					
EXTERNAL COMBUSTION					
RESIDENTIAL FUEL (AREA)					
BITUMINOUS COAL	2147	11424	322	2147	9663
DISTILLATE OIL	544	2358	652	163	272
NATURAL GAS	813	26	2140	342	856
WOOD	157	3	63	13	13
TOTAL (RESIDENTIAL)	3662	13810	3178	2665	10803
ELEC GENERATION (POINT)					
ANTHRACITE COAL	188	1069	98	2	56
BITUMINOUS COAL	46766	933254	270602	2199	7304
RESIDUAL OIL	100	4939	1363	26	39
DISTILLATE OIL	50	102	699	13	20
NATURAL GAS	139	10	10732	18	304
TOTAL (ELEC GEN)	47243	939375	283495	2258	7724
INDUSTRIAL FUEL					
BITUMINOUS COAL					
AREA SOURCES	15522	14342	2022	135	270
POINT SOURCES	15147	40190	5519	227	510
RESIDUAL OIL					
AREA SOURCES	117	1062	305	15	1
POINT SOURCES	952	17194	3887	194	247
DISTILLATE OIL					
AREA SOURCES	125	316	498	25	2
POINT SOURCES	107	200	429	21	29
NATURAL GAS					
AREA SOURCES	533	18	5333	1185	12
POINT SOURCES	131	6	2287	30	160
PROCESS GAS					
POINT SOURCES	0	0	67	1	5
WOOD					
POINT SOURCES	8	0	3	1	1
TOTAL (INDUSTRIAL)					
AREA SOURCES	16297	15738	8159	1360	284
POINT SOURCES	16344	57590	12191	474	951
COMM-INSTITUTIONAL FUEL					
BITUMINOUS COAL					
AREA SOURCES	3053	5958	515	112	403
POINT SOURCES	1271	1683	229	16	33
RESIDUAL OIL					
AREA SOURCES	410	2839	1069	53	4
POINT SOURCES	44	392	115	6	8
DISTILLATE OIL					
AREA SOURCES	277	524	1108	55	4
POINT SOURCES	6	13	24	1	2
NATURAL GAS					
AREA SOURCES	299	9	1572	126	314
POINT SOURCES	35	1	312	15	38
LIQUID PETROL GAS					
POINT SOURCES	0	1	1	0	0
TOTAL (COMM-INST)					
AREA SOURCES	4039	9331	4265	347	725
POINT SOURCES	1356	2090	681	36	80

Figure 4. AQCR Emissions Report

TOTAL (EXTERNAL COMB)					
AREA SOURCES	23997	38879	15602	4372	11812
POINT SOURCES	64943	999056	296367	2770	8755
INTERNAL COMBUSTION (POINT)					
ELECTRIC GENERATION					
DISTILLATE OIL	6	16	410	147	32
NATURAL GAS	2	1	247	144	24
DIESEL	0	0	7	1	4
TOTAL (ELEC GEN)	9	18	663	293	60
INDUSTRIAL FUEL					
NATURAL GAS	0	0	29	0	0
TOTAL (INDUSTRIAL)	0	0	29	0	0
TOTAL (INTERNAL COMB)	9	18	692	293	60
TOTAL (FUEL COMBUSTION)					
AREA SOURCES	23997	38879	15602	4372	11812
POINT SOURCES	64951	999074	297059	3063	8815
INDUSTRIAL PROCESS (POINT)					
CHEMICAL MANUFACTURING	381	8605	139	2193	35097
FOOD/AGRICULTURAL	1433	0	0	0	0
PRIMARY METAL	213175	137595	73	1578	2644503
SECONDARY METALS	371	1894	34	16	1191
MINERAL PRODUCTS	30262	0	1324	535	0
PETROLEUM INDUSTRY	5876	38025	11951	12561	141199
WOOD PRODUCTS	2	0	0	0	0
EVAPORATION	2	0	0	58238	0
METAL FABRICATION	26	0	0	0	0
INPROCESS FUEL	110	1705	84	15	17
OTHER/NOT CLASSIFIED	1	0	0	0	0
TOTAL (INDUSTRIAL)	251638	187825	13604	75137	2822007
SOLID WASTE DISPOSAL					
GOVERNMENT (POINT)					
MUNICIPAL INCINERATION	514	365	292	219	5112
TOTAL (GOVERNMENT)	514	365	292	219	5112
RESIDENTIAL (AREA)					
ON SITE INCINERATION	1088	18	36	3626	10878
OPEN BURNING	682	43	256	1450	3625
TOTAL (RESIDENTIAL)	1770	61	292	5076	14503
COMMERCIAL-INSTITUTIONAL					
ON SITE INCINERATION					
AREA SOURCES	144	18	24	120	240
POINT SOURCES	4	1	0	4	5
OPEN BURNING					
AREA SOURCES	226	14	85	479	1198
TOTAL (COMM-INST)					
AREA SOURCES	370	32	109	599	1438
POINT SOURCES	4	1	0	4	5
INDUSTRIAL					
ON SITE INCINERATION					
AREA SOURCES	1434	179	239	1195	2390
POINT SOURCES	32	29	37	55	330
OPEN BURNING					
AREA SOURCES	1014	63	380	2156	5389
TOTAL (INDUSTRIAL)					
AREA SOURCES	2448	243	619	3351	7779
POINT SOURCES	32	29	37	55	330

Figure 4 (continued). AQCR Emissions Report.

TOTAL (SOLID WASTE DISP)					
AREA SOURCES	4588	336	1020	9026	23721
POINT SOURCES	550	395	329	278	5446
TRANSPORTATION (AREA)					
**********					
LAND VEHICLES					
GASOLINE					
LIGHT VEHICLES	4455	2673	63860	141913	803634
HEAVY VEHICLES	419	251	13972	30167	127582
OFF HIGHWAY	65	40	1419	4459	24432
TOTAL (GASOLINE)	4939	2965	79251	176540	955648
DIESEL					
HEAVY VEHICLES	652	1304	18475	1848	10868
OFF HIGHWAY	130	271	3711	371	2257
RAIL	729	1895	2187	1458	2041
TOTAL (DIESEL)	1511	3470	24373	3676	15165
AIRCRAFT					
MILITARY	1158	221	556	2695	2893
CIVIL	41	8	37	182	1042
COMMERCIAL	906	201	567	2174	5156
TOTAL (AIRCRAFT)	2105	430	1160	5051	9090
VESSELS					
DIESEL FUEL	371	966	1114	743	1040
RESIDUAL OIL	13	56	34	2	0
TOTAL (VESSELS)	384	1022	1148	744	1040
GAS HANDLING EVAP LOSS	0	0	0	12052	0
TOTAL (TRANSPORTATION)	8940	7887	105932	198063	980944
MISCELLANEOUS (AREA)					
**********					
SOLVENT EVAPORATION LOSS	0	0	0	5184	0
TOTAL (MISCELLANEOUS)	0	0	0	5184	0
GRAND TOTAL					
**********					
AREA SOURCES	37525	47101	122554	216646	1016477
POINT SOURCES	317140	1187294	310992	78477	2836269
TOTAL	354665	1234395	433547	295123	3852746

Figure 4 (continued). AQCR Emissions Report.

Figure 4. (Continued)

STATIONARY SOURCE FUEL SUMMARY REPORT

NATIONAL EMISSION DATA SYSTEM

ENVIRONMENTAL PROTECTION AGENCY

USER FILE CREATE DATE
WEDNESDAY DECEMBER 19, 1973

DATE OF RUN
01/26/74

COUNTY FUEL REPORT:ILLINOIS COUNTY: BOND

CURRENT ANNUAL FUEL SUMMARY

	ANTH COAL TONS	BITM COAL TONS	RESID OIL 1000 GALS	DIST OIL 1000 GALS	NAT GAS 10E6 CUFT	PROC GAS 10E6 CUFT	COKE TONS	WOOD TONS
AREA SOURCES								
RESIDENTIAL		5520		2350	290			
INDUSTRIAL		710	30	40	60			200
COMM-INSTL			760		170			
TOTAL		6230	790	2390	520			200
POINT SOURCES								
EXT COMB								
ELEC GEN								
INDUSTRIAL								
COMM-INSTL								
TOTAL								
INPROCESS								
INTERNL COMB								
ELEC GEN								
INDUSTRIAL								
COMM-INSTL								
TOTAL								
GRAND TOTAL		6230	790	2390	520			200

	LIGNITE TONS	BAGASSE TONS	SW/COAL TONS	LIG-PETRO 1000 GALS	DIESEL 1000 GALS	GASOLINE 1000 GALS	JET FUEL 1000 GALS
POINT SOURCES							
EXT COMB							
ELEC GEN							
INDUSTRIAL							
COMM-INSTL							
INTERNL COMB							
ELEC GEN							
INDUSTRIAL							
COMM-INSTL							
ENG-TEST							
TOTAL							
GRAND TOTAL							

Figure 5. County Fuel Report

STATIONARY SOURCE FUEL SUMMARY REPORT

NATIONAL EMISSION DATA SYSTEM

ENVIRONMENTAL PROTECTION AGENCY

USER FILE CREATE DATE
WEDNESDAY DECEMBER 19, 1973

DATE OF RUN
01/26/74

AQCR FUEL REPORT:METROPOLITAN ST. LOUIS (ILL-MO)

CURRENT ANNUAL FUEL SUMMARY

	ANTH COAL	BITN COAL	RESID OIL	DIST OIL	NAT GAS	PROC GAS	COKE	WOOD
	TONS	TONS	1000 GALS	1000 GALS	1OE6 CUFT	1OE6 CUFT	TONS	TONS
AREA SOURCES								
RESIDENTIAL		214730		108750	85610			12600
INDUSTRIAL		269580	10180	16610	59260			
COMM-INSTL		112000	35650	36920	31450			
TOTAL		596310	45830	162280	176320			12600
POINT SOURCES								
EXT COMB								
ELEC GEN	18760	14569353	25958	13321	35777			
INDUSTRIAL		643821	129575	14315	10909	580		548
COMM-INSTL		30847	3818	813	3780			
TOTAL	18760	15244021	159351	28449	60466	580		548
INPROCESS		123300						
INTERNL COMB								
ELEC GEN				277	221			
INDUSTRIAL					75			
COMM-INSTL								
TOTAL				277	296			
GRAND TOTAL	18760	15963631	205181	191006	237082	580		13148

	LIGNITE	BAGASSE	SN/COAL	LIG-PETRO	DIESEL	GASOLINE	JET FUEL
	TONS	TONS	TONS	1000 GALS	1000 GALS	1000 GALS	1000 GALS
POINT SOURCES							
EXT COMB							
ELEC GEN							
INDUSTRIAL				3			
COMM-INSTL				131			
INTERNL COMB							
ELEC GEN							
INDUSTRIAL					37		
COMM-INSTL							
ENG-TEST							
TOTAL				134	37		
GRAND TOTAL				134	37		

Figure 6. AQCR Fuel Report

WEIGHTED SENSITIVITY ANALYSIS REPORT 2
NATIONAL EMISSIONS DATA SYSTEM
****
ENVIRONMENTAL PROTECTION AGENCY
****

AQCR EMISSIONS REPORT
****
AQCR 070 METROPOLITAN ST. LOUIS (ILL-MO)

RUN DATE: FEBRUARY 8, 1974
EMISSIONS AS OF: DECEMBER 19, 1973

SOURCE HIERARCHY
GRAND TOTAL

DRIVER TABLE 1

PARTICULATES

THETA = 3.16

DATA NO.	SOURCE CLASSES	TONS / YR	ALLOWABLE ERROR PERCENT	ALLOWABLE ERROR TONS / YR
235	AREA SOURCES	37525.	9.71	3645.
236	POINT SOURCES	317140.	3.34	10598.
	TOTAL	354665.	3.16	11207.

SOX

THETA = 3.16

DATA NO.	SOURCE CLASSES	TONS / YR	ALLOWABLE ERROR PERCENT	ALLOWABLE ERROR TONS / YR
235	AREA SOURCES	47101.	16.18	7620.
236	POINT SOURCES	1187294.	3.22	38255.
	TOTAL	1234395.	3.16	39007.

NOX

THETA = 3.16

DATA NO.	SOURCE CLASSES	TONS / YR	ALLOWABLE ERROR PERCENT	ALLOWABLE ERROR TONS / YR
[illegible]	AREA SOURCES	122554	[illegible]	[illegible]
[illegible]	POINT SOURCES	310	[illegible]	[illegible]
	TOTAL	[illegible]	[illegible]	[illegible]

SOURCE HIERARCHY
POINT SOURCES

DRIVER TABLE 2

PARTICULATES

THETA = 3.34

DATA NO.	SOURCE CLASSES	TONS / YR	ALLOWABLE ERROR PERCENT	ALLOWABLE ERROR TONS / YR
129	FUEL COMBUSTION	64951.	7.38	4796.
145	INDUSTRIAL PROCESS (POINT)	251638.	3.75	9440.
190	SOLID WASTE DISPOSAL	550.	80.24	441.
231	OTHER (POINT)	0.	---	---
	TOTAL	317139.	3.34	10598.

SOX

THETA = 3.22

DATA NO.	SOURCE CLASSES	TONS / YR	ALLOWABLE ERROR PERCENT	ALLOWABLE ERROR TONS / YR
129	FUEL COMBUSTION	999074.	3.51	35092.
145	INDUSTRIAL PROCESS (POINT)	187825.	8.10	15216.
190	SOLID WASTE DISPOSAL	395.	176.65	698.
231	OTHER (POINT)	0.	---	---
	TOTAL	1187294.	3.22	38255.

NOX

THETA = 3.73

DATA NO.	SOURCE CLASSES	TONS / YR	ALLOWABLE ERROR PERCENT	ALLOWABLE ERROR TONS / YR
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Figure 7. Weighted Sensitivity Analysis

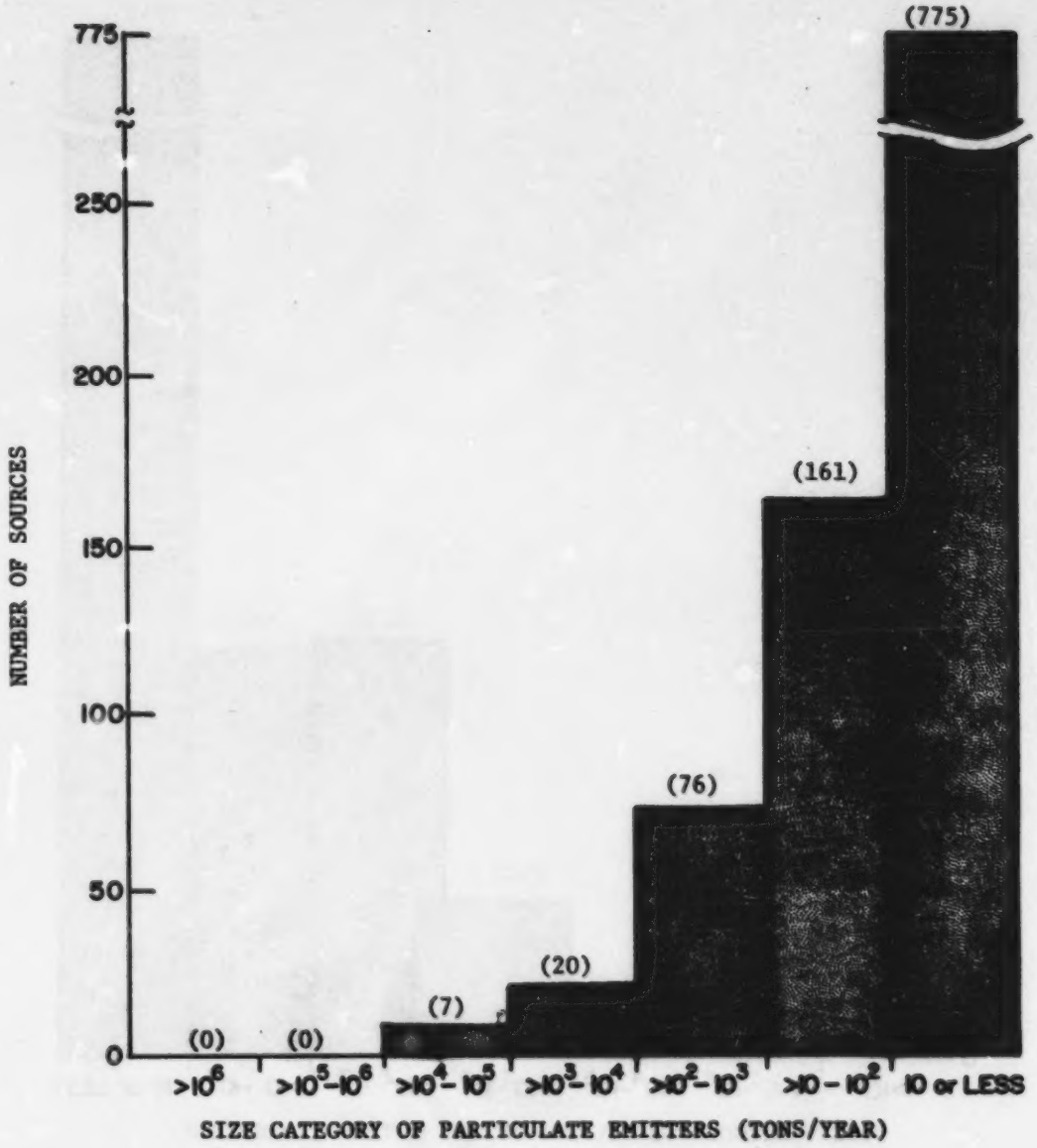

Figure 8. Frequency Distribution of Particulate Emitters by Total Emissions, Metropolitan St. Louis AQCR (070) 1,039 Total Point Sources

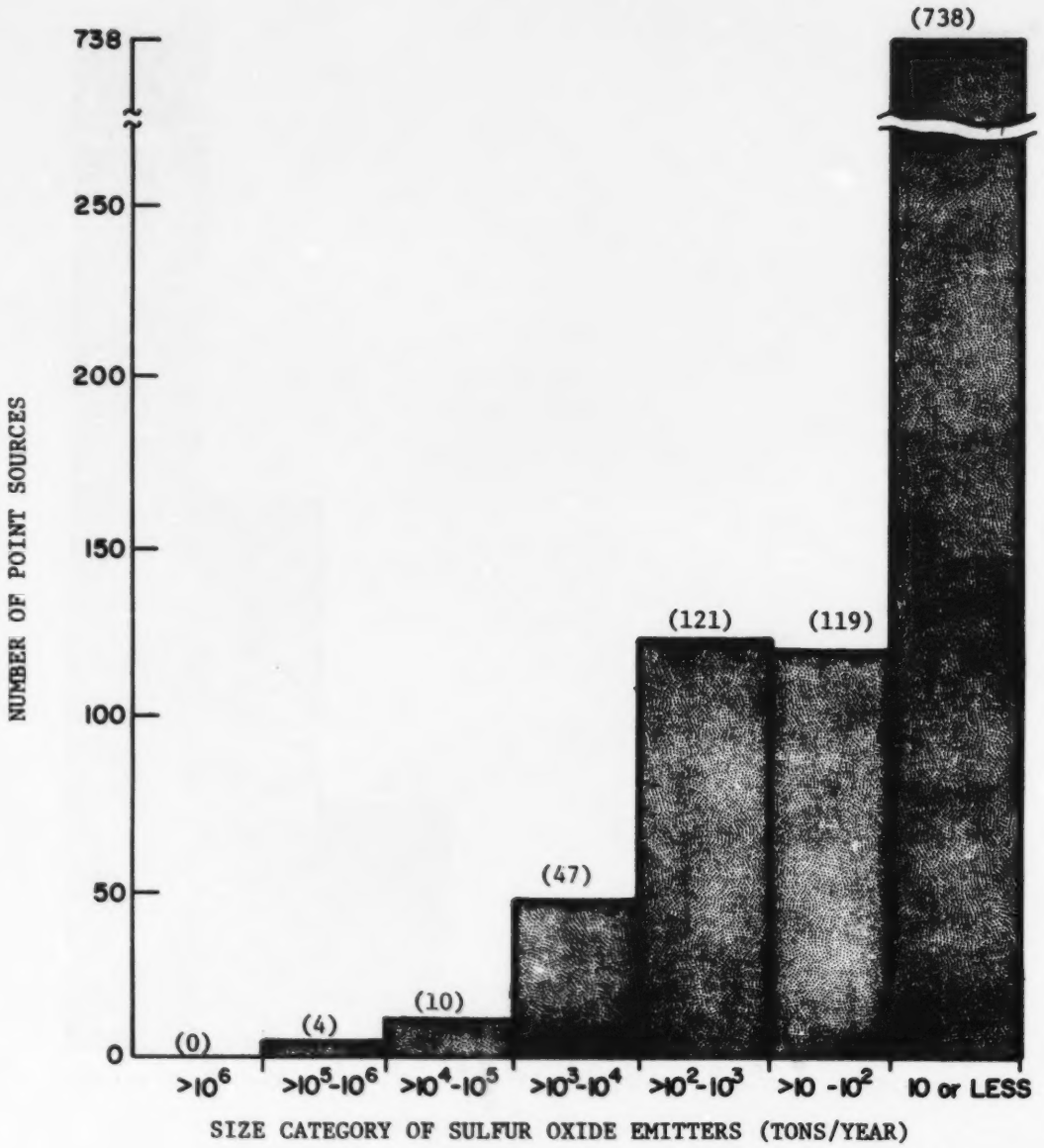

Figure 9. Frequency Distribution of Sulfur Oxide Emitters by Total Emissions, Metropolitan St. Louis AQCR (070) 1,039 Total Point Sources

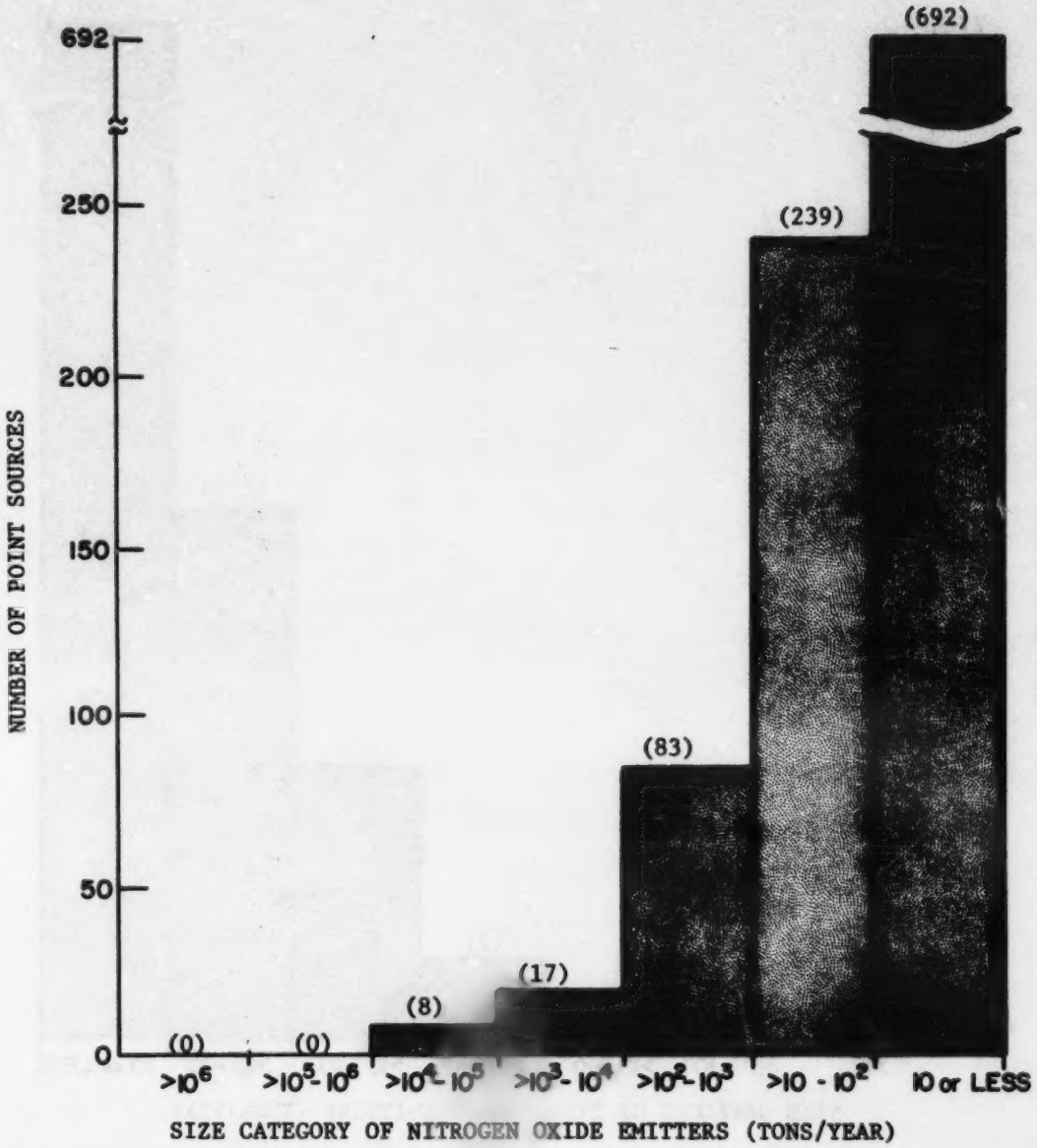

Figure 10. Frequency Distribution of Nitrogen Oxide Emitters by Total Emissions, Metropolitan St. Louis AQCR (070) 1,039 Total Point Sources

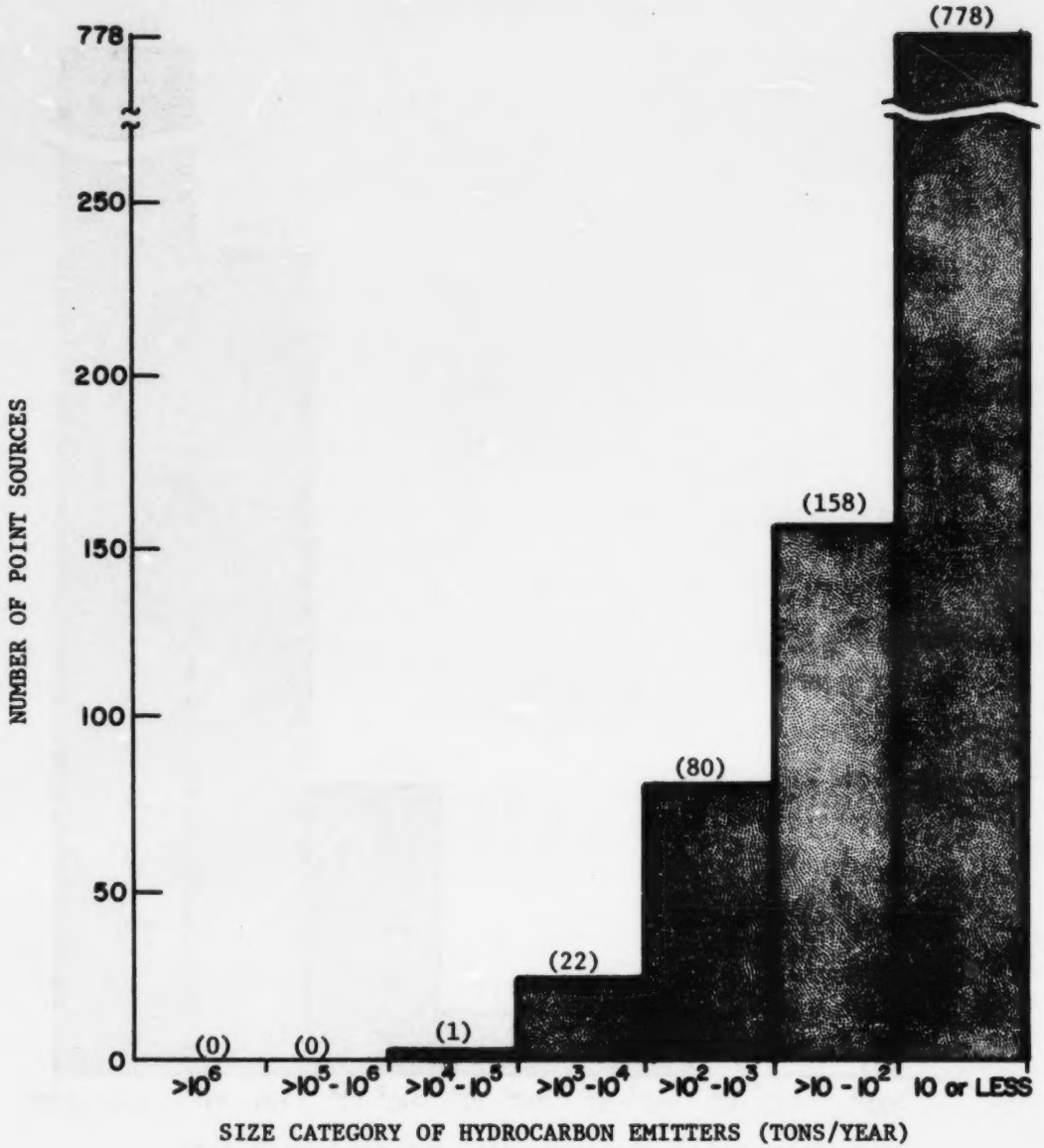

Figure 11. Frequency Distribution of Hydrocarbon Emitters by Total Emissions, Metropolitan St. Louis AQCR (070) 1,039 Total Point Sources

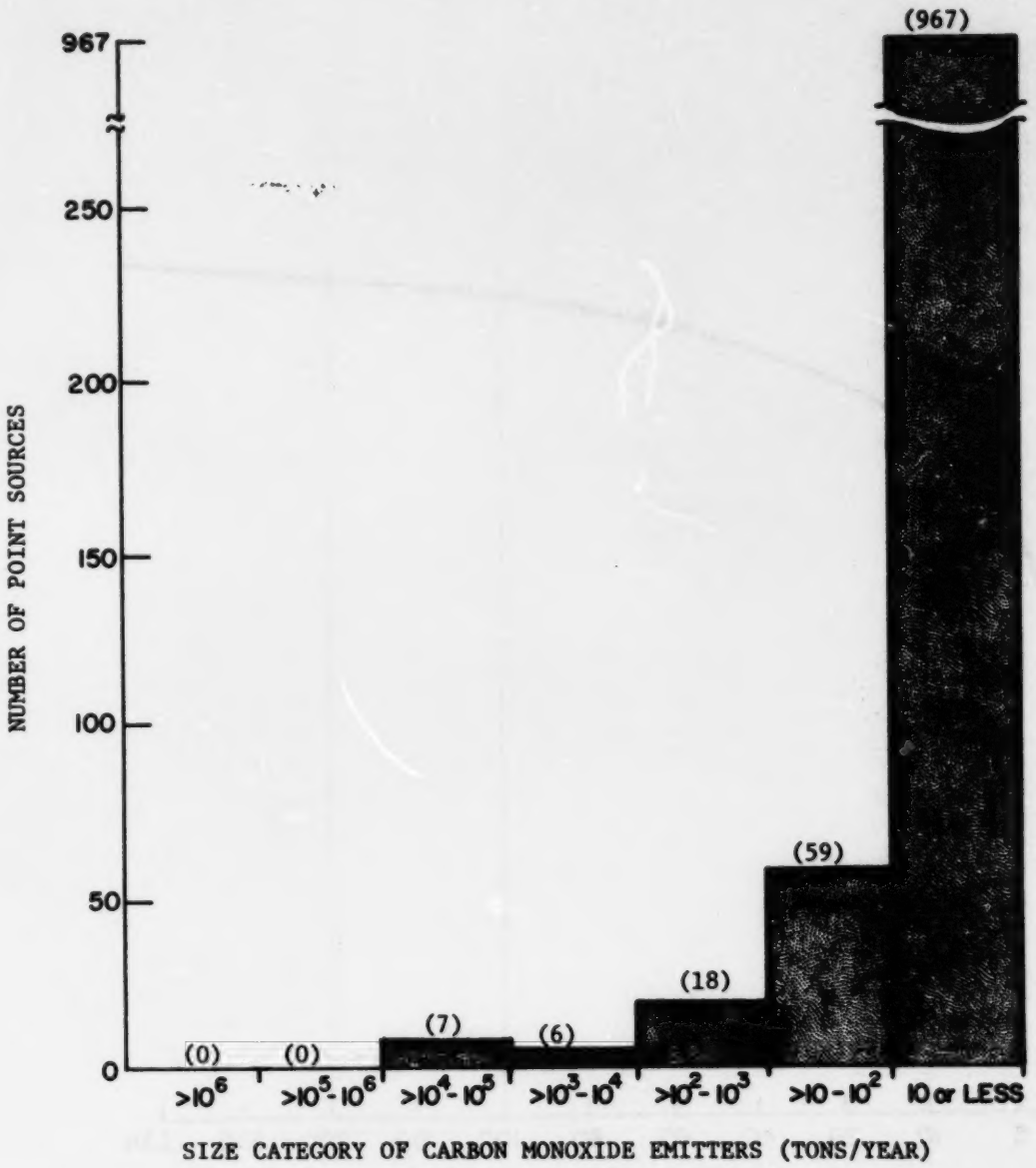

Figure 12. Frequency Distribution of Carbon Monoxide Emitters by Total Emissions, Metropolitan St. Louis AQCR (070) 1,039 Total Point Sources

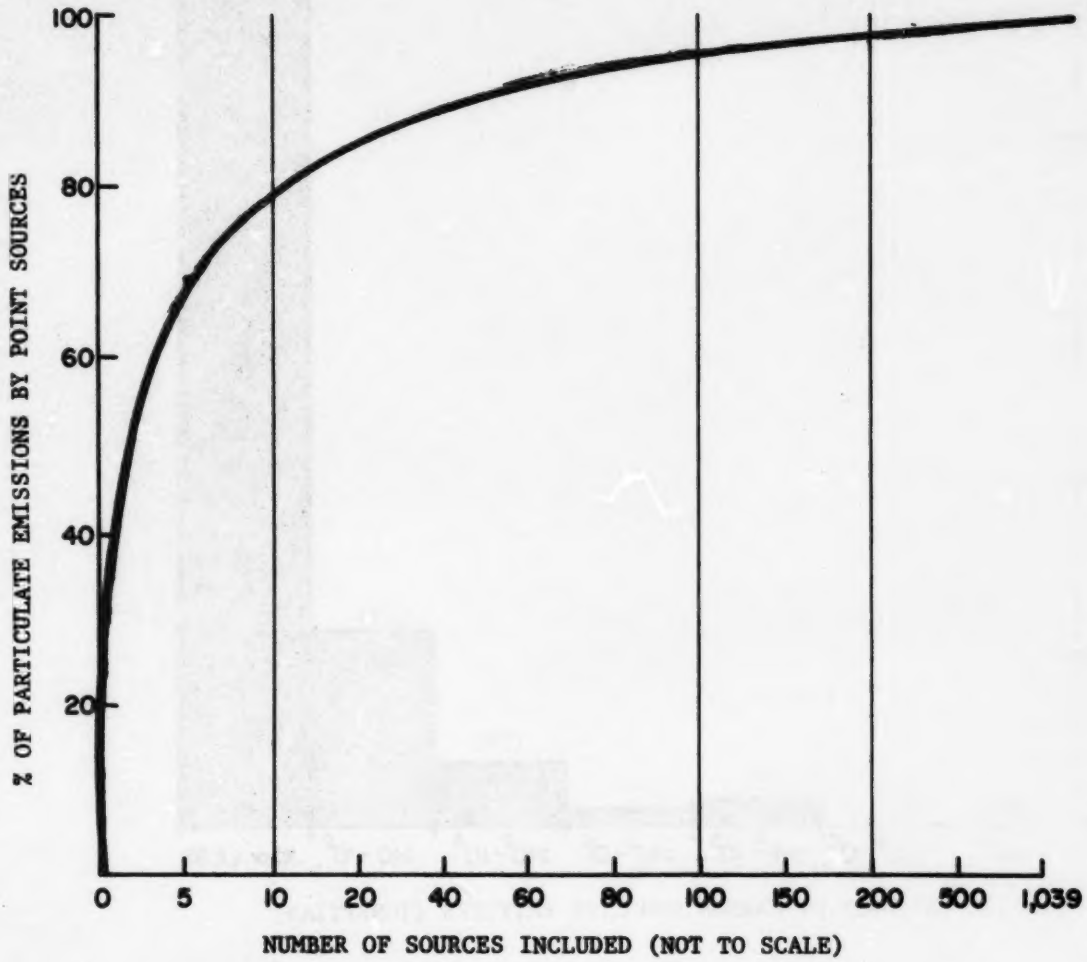

Figure 13. Percent of Particulate Emissions by 1,039 Point Sources, Metropolitan St. Louis AQCR (070), Total Emissions of 322,000 Tons/Year

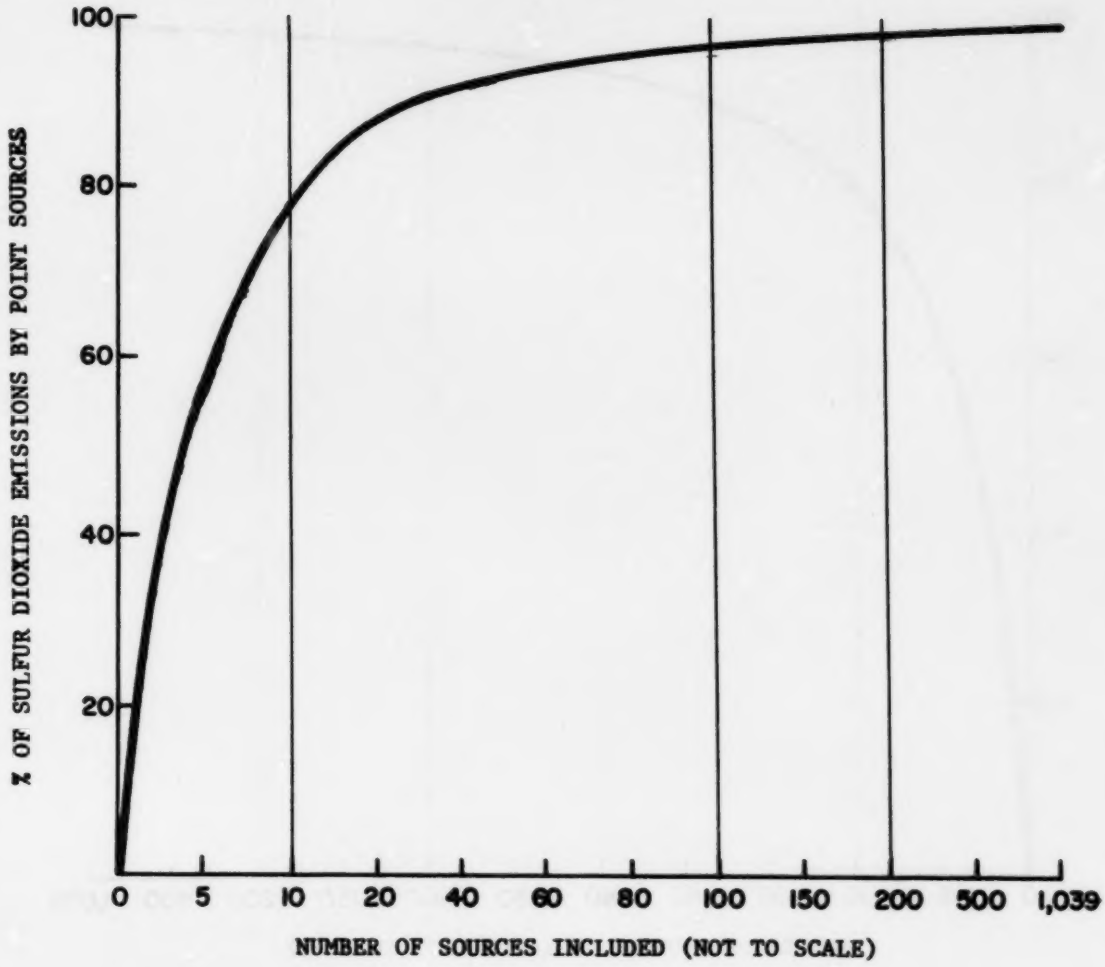

Figure 14. Percent of Sulfur Oxide Emissions by 1,039 Point Sources, Metropolitan St. Louis AQCR (070), Total Emissions of 1,188,000 Tons/Year

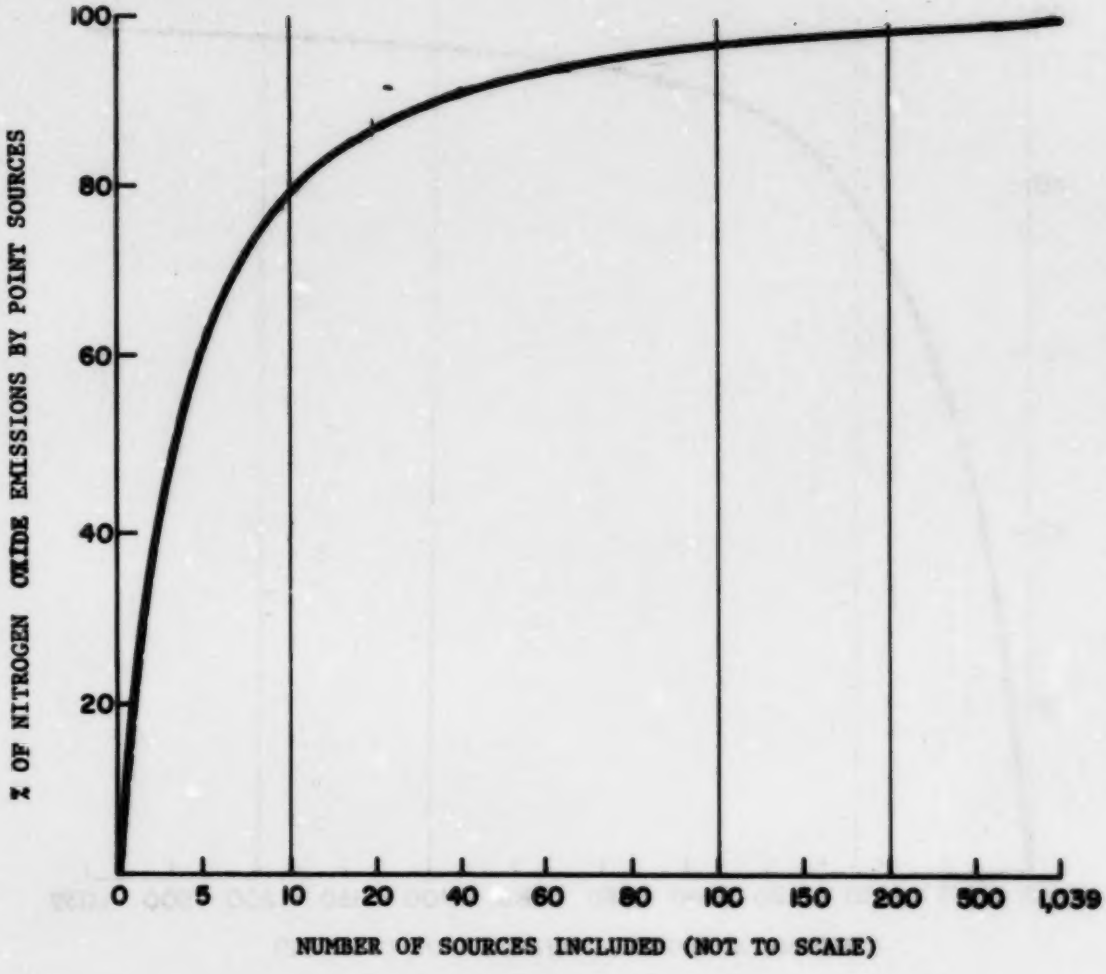

Figure 15. Percent of Nitrogen Oxide Emissions by 1,039 Point Sources, Metropolitan St. Louis AQCR (070), Total Emissions of 312,600 Tons/Year

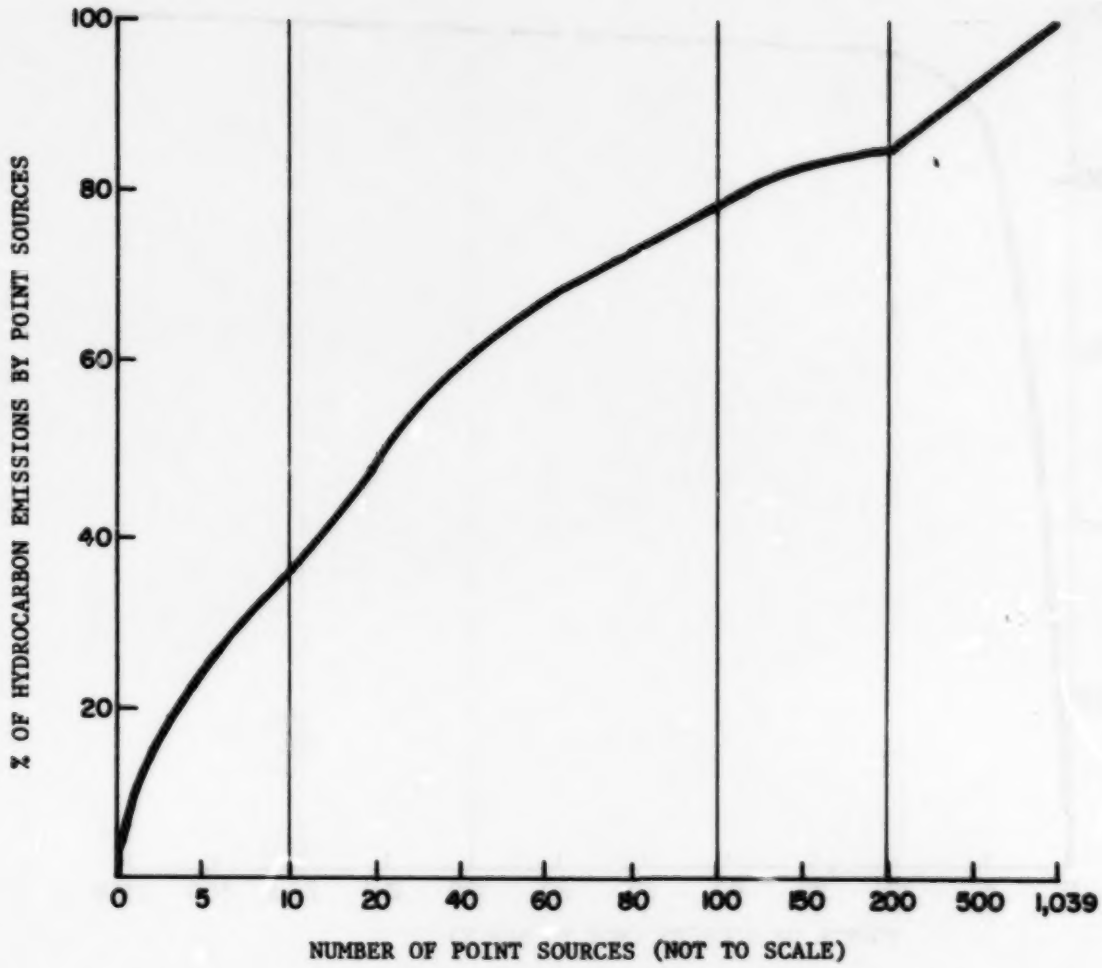

Figure 16. Percent of Hydrocarbon Emissions by 1,039 Point Sources, Metropolitan St. Louis AQCR, Total Emissions of 80,155 Tons/Year

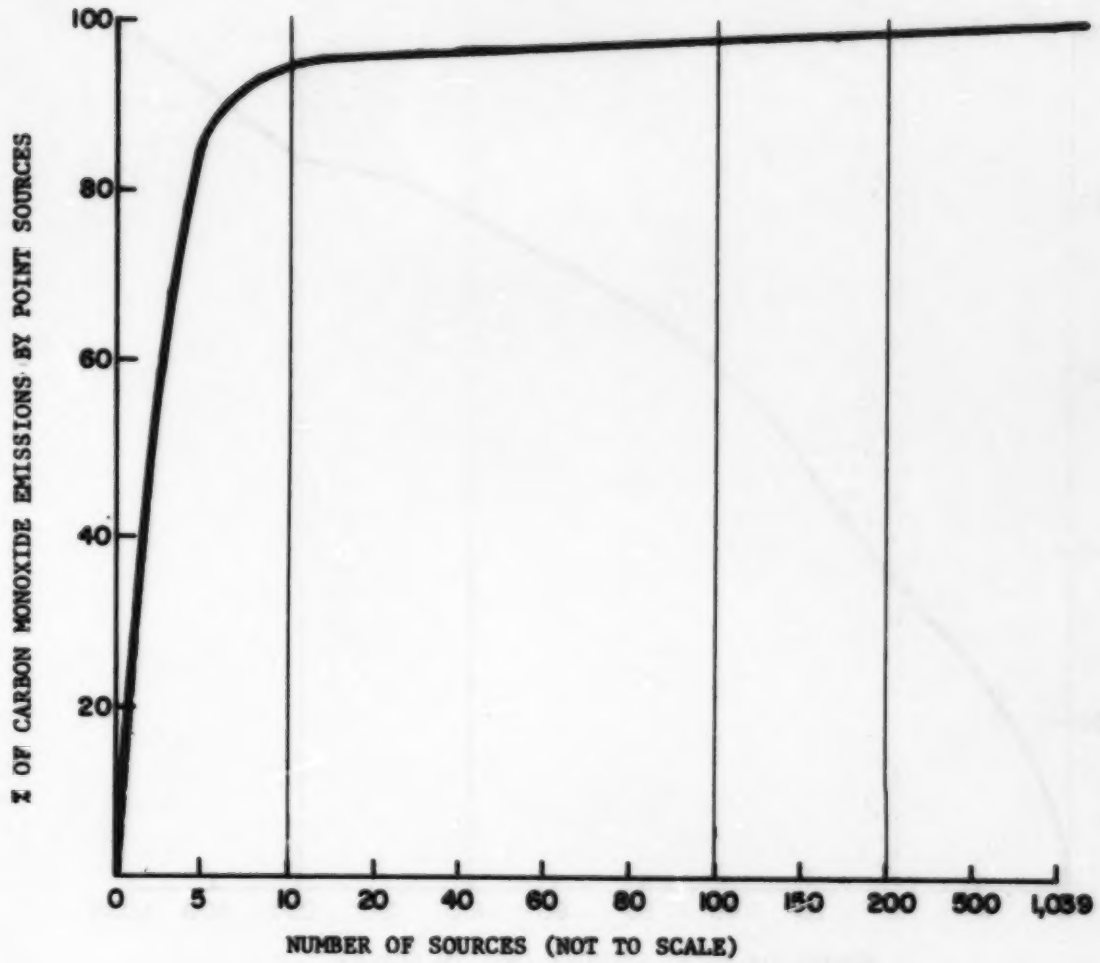

Figure 17. Percent of Carbon Monoxide Emissions by 1,039 Point Sources, Metropolitan St. Louis AQCR (070), Total Emissions of 2,842,000 Tons/Year

SOURCE ID: A STATE- 26 COUNTY- 4280 AQCR- 070 YEAR- 70

EM-EST-PRT(100-TONS)=	113	EM-EST-SO2(100-TONS)=	245	EM-EST-NOX(100-TONS)=		EM-EST-HC(100-TONS)=	
EM-EST-CO(100-TONS)=		% SULF-ANTH-COAL=		% SULF-BITUM-COAL=	2.8	% SULF-DIST-OIL=	0.2
% SULF-RESID-OIL=	1.6	% ASH-ANTH-COAL=		% ASH-BITUM-COAL=	9.4	RES-ANTH(10-TONS)=	
RES-BITUM(10-TONS)=	1856	RES-DIS-OIL(10E4-GAL)=	1356	RES-RID-OIL(10E4-GAL)=	0	RES-N-GAS(10E7-CUFT)=	2640
RES-WOOD(100-TONS)=	18	CI-ANTH(10-TONS)=		CI-BITUM(10-TONS)=	11200	CI-DIS-OIL(10E4-GAL)=	3500
CI-RID-OIL(10E4-GAL)=	0	CI-N-GAS(10E7-CUFT)=	1110	CI-WOOD(100-TONS)=	0	IND-ANTH(10-TONS)=	
IND-BITUM(10-TONS)=	10000	IND-COKE(10-TONS)=		IND-DIS-OIL(10E4-GAL)=	1000	IND-RD-OIL(10E4-GAL)=	80
IND-N-GAS(10E7-CUFT)=	2860	IND-WOOD(100-TONS)=	0	IND-PR-GAS(10E7-CUFT)=			
RES-OS-INC(10-TONS)=	0	IND-OS-INC(100-TONS)=	0	CI-OS-INC(100-TONS)=	0	PART-EMS(T/YR)=	12067.564
RES-OP-BRN(100-TONS)=	0	IND-OPN-BRN(100-TONS)=	0	CI-OPN-BRN(100-TONS)=	0	SO2-EMS(T/YR)=	14893.097
GAS-LT-VEH(1000-GAL)=	261116	GAS-HVY-VEH(1000-GAL)=	35512	GAS-OFF-HWY(1000-GAL)=		NOX-EMS(T/YR)=	32897.865
DIE-HV-VEH(1000-GAL)=	24148	DIE-OFF-HWY(10E4-GAL)=	604	DIE-RR-LOC(10E4-GAL)=	975	HC-EMS(T/YR)=	51644.423
COUNTY-POP(1000)=	622	DENSITY-CODE=	9	MIL-AIRCRAFT(100-LTO)=		CO-EMS(T/YR)=	259655.105
CIV-AIRCRAFT(10-LTO)=		COMM-AIRCRAFT(10-LTO)=		VES-BITUM(10-TONS)=		NO. 6-EMS(T/YR)=	0.000
VES-DIE-OL(10E4-GAL)=	595	VES-RID-OIL(10E4-GAL)=		VES-GAS(1000-GAL)=		NO. 7-EMS(T/YR)=	0.000
EVAP-SOLVENT(T/YR)=	686	EVAP-GAS(10E5-GAL)=	2966	VEH-MI-LA-RD(10E4-MI)=		NO. 8-EMS(T/YR)=	0.000
VEH-MI-RURL(10E4-MI)=		VEH-MI-SUBAN(10E4-MI)=		VEH-MI-URBAN(10E4-MI)=		NO. 9-EMS(T/YR)=	0.000
DIRT-RD-TRV(1000-MI)=		DIRT-AIR-STRIPS(LTO)=		CONST-LAND(1000-ACRE)=		NO. 10-EMS(T/YR)=	0.000
ROCK-H-ST(1000-TONS)=		FOREST-FIRE-AR(ACRES)=		FOR-FIRE-QU(TON/ACRE)=		NO. 11-EMS(T/YR)=	0.000
SLASH-BRN-ARE(ACRES)=		SLASH-BN-QU(TON/ACRE)=		ORCHARD-HEATERS(100)=		NO. 12-EMS(T/YR)=	0.000
ORCH-DA-FIRED(DA/YR)=		STRUCTURE-FIRES(#/YR)=		CRB-SIZE-BK(100-CUYD)=			
COAL-REF-BURN(#/YR)=		COMMENTS=					

Figure 18. Area Source Emissions for St. Louis City

IPP INPUT DECK (METRO. ST. LOUIS)

REC NO	ID	UTMX	UTMY	AREA	HGT	SO2	SP	NOX	HC	CO	STATE	COUNTY	TYPE
07099991	74507900431	00		250	33	0.0	0.0	0.0	0.0	0.0	14	520	A
07099991	74607900431	50		250	33	0.0	0.0	0.0	0.0	0.0	14	520	A
07099991	76207950429	501	000		33	0.143	0.084	0.168	0.409	1.628	14	520	A
07099991	76307950430	501	000		33	0.078	0.046	0.143	0.304	1.285	14	520	A
07099991	76407950431	501	000		33	0.149	0.082	0.159	0.390	1.553	14	520	A
07099991	77408000432	50		250	33	0.023	0.015	0.123	0.222	1.013	14	520	A
07099991	79408050429	501	000		33	0.052	0.033	0.169	0.323	1.433	14	520	A
07099991	79508050430	501	000		33	0.541	0.297	0.448	1.212	4.641	14	520	A
07099991	79608050431	501	000		33	0.058	0.036	0.158	0.310	1.355	14	520	A
07099991	79708050432	50		250	33	0.060	0.076	1.387	2.332	11.001	14	520	A
07099991	81508150429	501	000		33	0.063	0.038	0.160	0.316	1.377	14	520	A
07099991	81608150430	501	000		33	0.177	0.096	0.174	0.435	1.711	14	520	A
07099991	81708150431	501	000		33	0.069	0.040	0.155	0.313	1.356	14	520	A
07099991	69607850426	00		250	33	0.001	0.000	0.001	0.000	0.001	14	1440	A
07099991	69707850426	50		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	69807850426	60		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	69907850426	70		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	70007850426	80		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	70107850426	90		10	33	0.000	0.000	0.000	0.000	0.000	14	1440	A
07099991	70207850427	00		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	70307850427	10		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	70407850427	20		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	70507850427	30		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	70607850427	40		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	70707850427	50		250	33	0.181	0.113	0.107	0.316	1.067	14	1440	A
07099991	71407860426	50		160	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	71507860426	90		10	33	0.000	0.000	0.000	0.000	0.000	14	1440	A
07099991	71607860427	00		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	71707860427	10		160	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	71807870426	90		10	33	0.081	0.050	0.040	0.130	0.424	14	1440	A
07099991	71907870427	00		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	72407880426	90		10	33	0.000	0.000	0.000	0.000	0.000	14	1440	A
07099991	72507880427	00		10	33	0.074	0.046	0.038	0.121	0.395	14	1440	A
07099991	72607890426	90		10	33	0.000	0.000	0.000	0.000	0.000	14	1440	A
07099991	72707890427	00		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	73907900426	00		250	33	0.001	0.000	0.001	0.000	0.001	14	1440	A
07099991	74007900426	50		250	33	0.104	0.065	0.080	0.214	0.770	14	1440	A
07099991	74107900427	00		250	33	0.001	0.000	0.001	0.000	0.001	14	1440	A
07099991	74207900427	50		250	33	0.060	0.039	0.078	0.175	0.684	14	1440	A
07099991	75707950426	50		250	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	75807950427	00		250	33	0.045	0.031	0.084	0.173	0.712	14	1440	A
07099991	75907950427	50		250	33	0.062	0.040	0.079	0.178	0.696	14	1440	A
07099991	76007950428	00		250	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	76107950428	501	000		33	0.084	0.057	0.180	0.363	1.529	14	1440	A
07099991	76708000426	50		250	33	0.049	0.033	0.084	0.178	0.731	14	1440	A
07099991	76808000427	00		250	33	0.082	0.053	0.078	0.191	0.709	14	1440	A
07099991	76908000427	50		40	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	77008000427	70		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	77108000427	80		10	33	0.000	0.000	0.000	0.000	0.000	14	1440	A
07099991	77208000427	90		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	77308000428	00		250	33	0.0	0.0	0.0	0.0	0.0	14	1440	A
07099991	77508081042	70		10	33	0.0	0.0	0.0	0.0	0.0	14	1440	A

Figure 19. Listing of IPP Input Cards Produced by CAASE

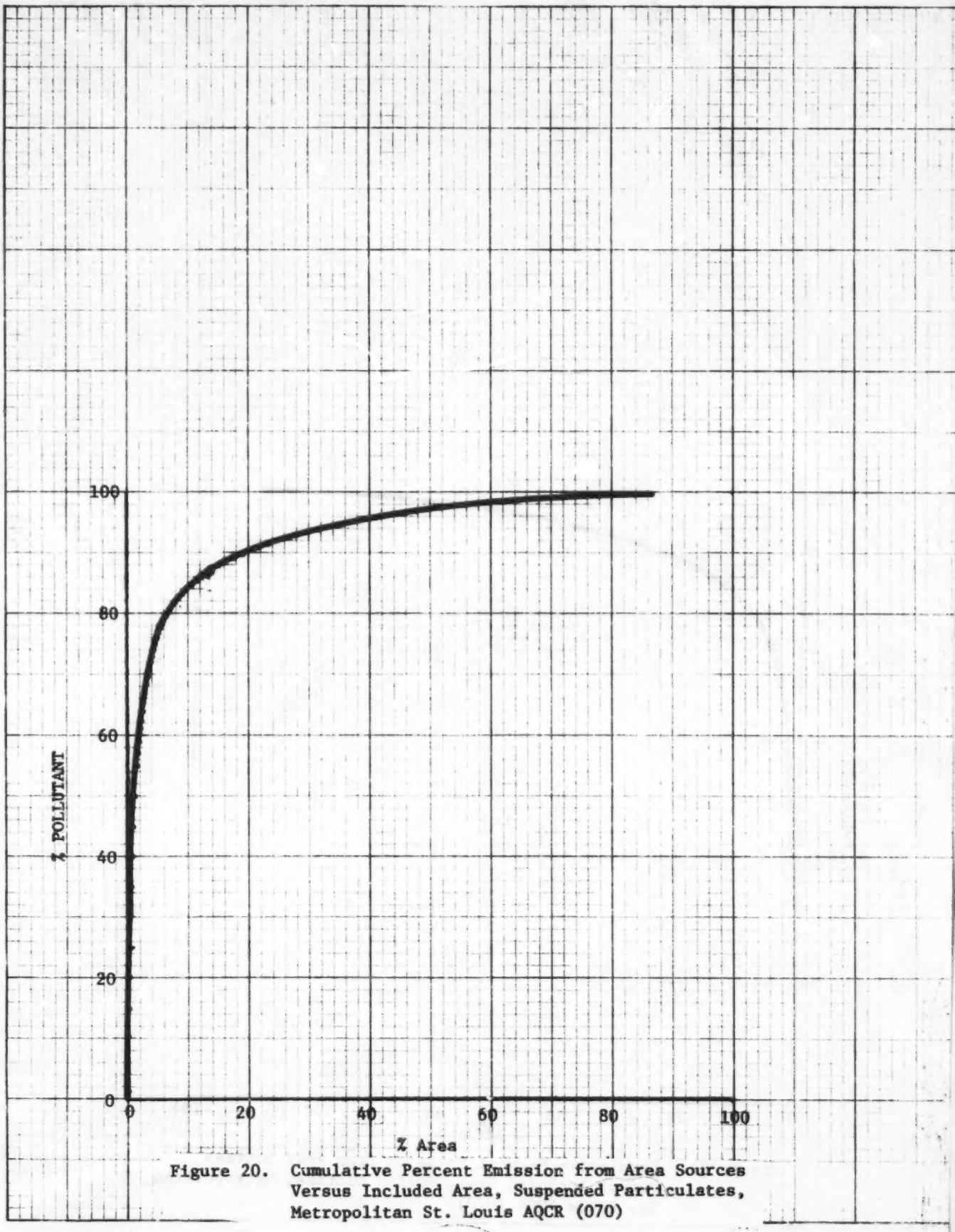

Figure 20. Cumulative Percent Emission from Area Sources Versus Included Area, Suspended Particulates, Metropolitan St. Louis AQCR (070)

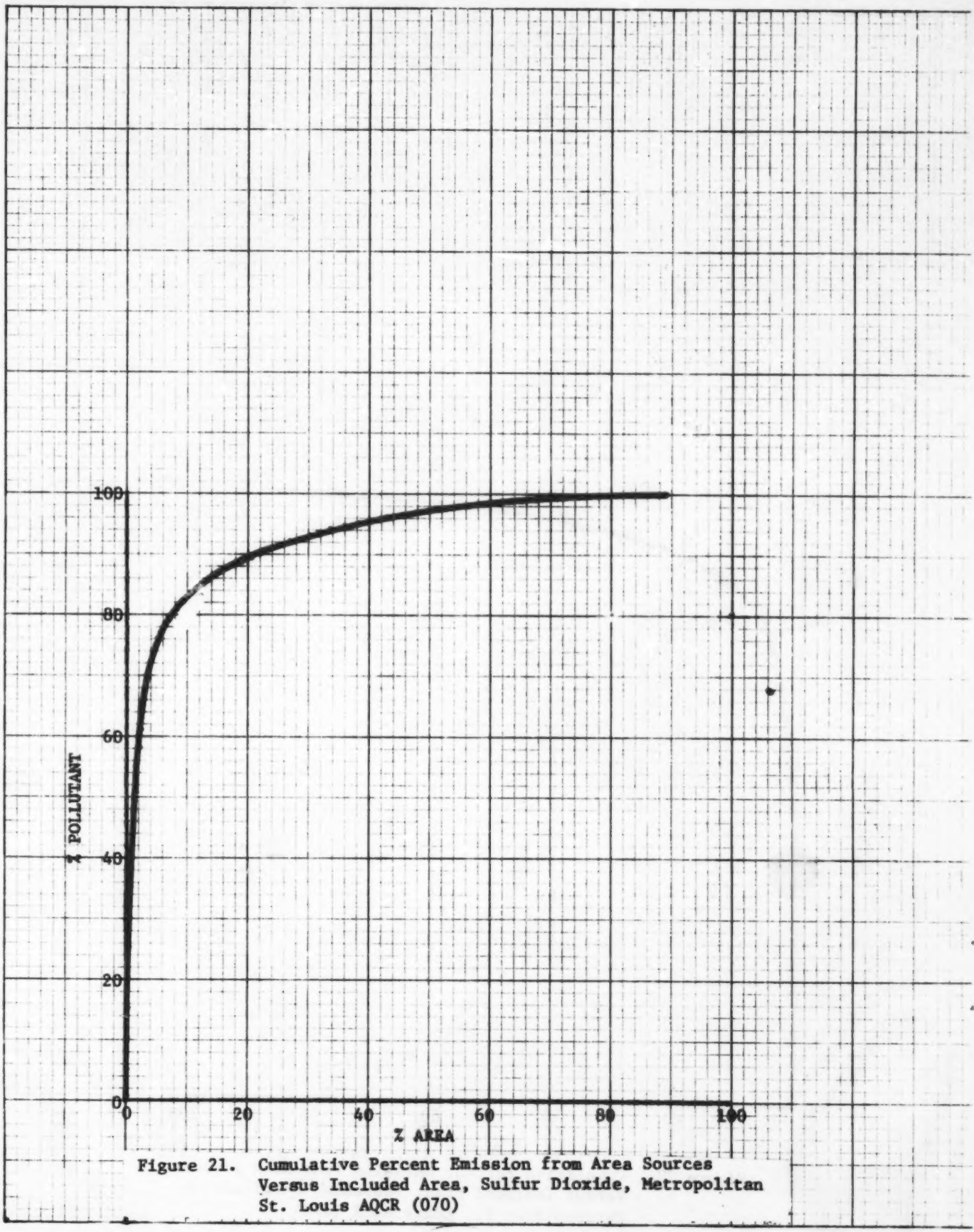

Figure 21. Cumulative Percent Emission from Area Sources Versus Included Area, Sulfur Dioxide, Metropolitan St. Louis AQCR (070)

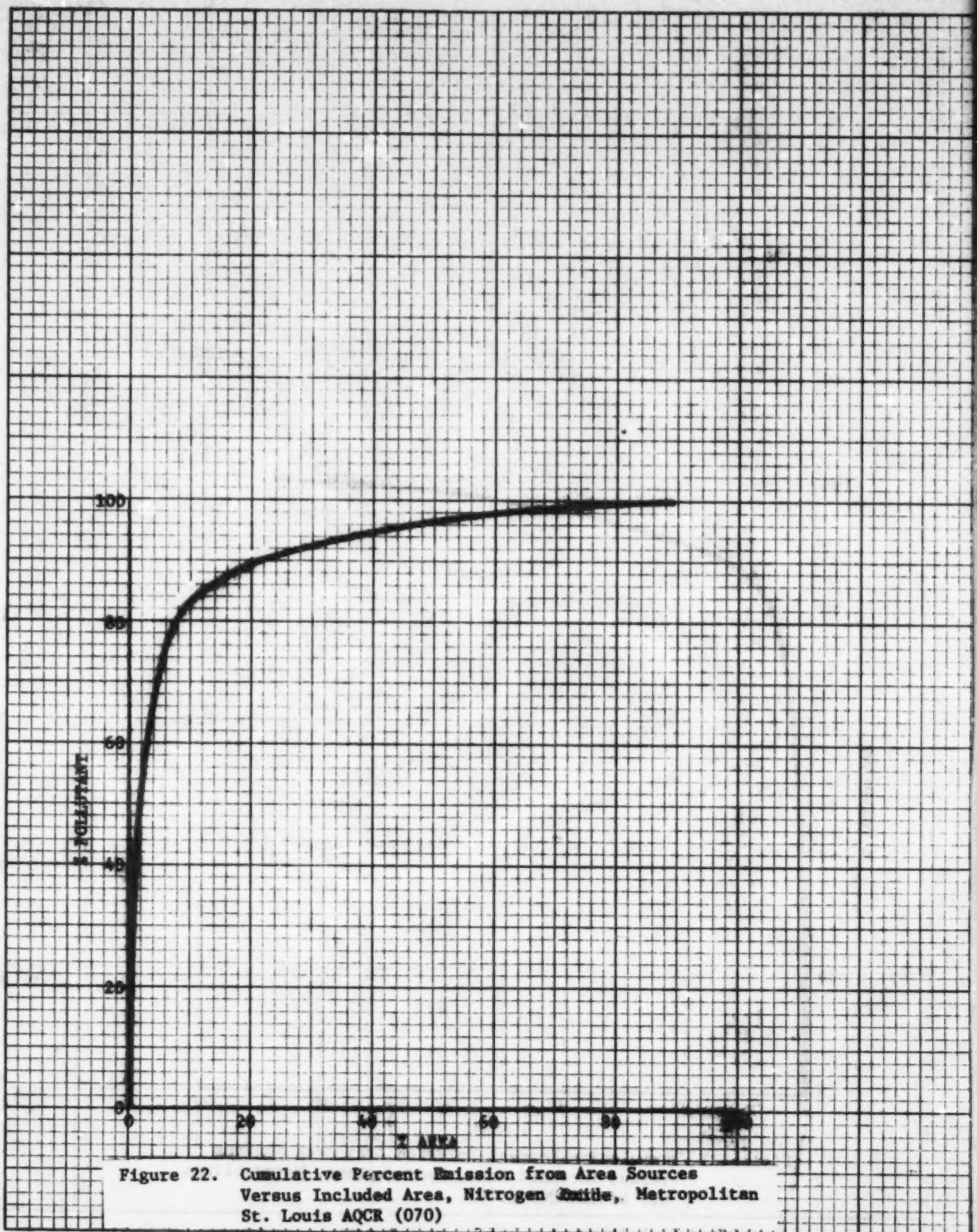

Figure 22. Cumulative Percent Emission from Area Sources Versus Included Area, Nitrogen Oxide, Metropolitan St. Louis AQCR (070)

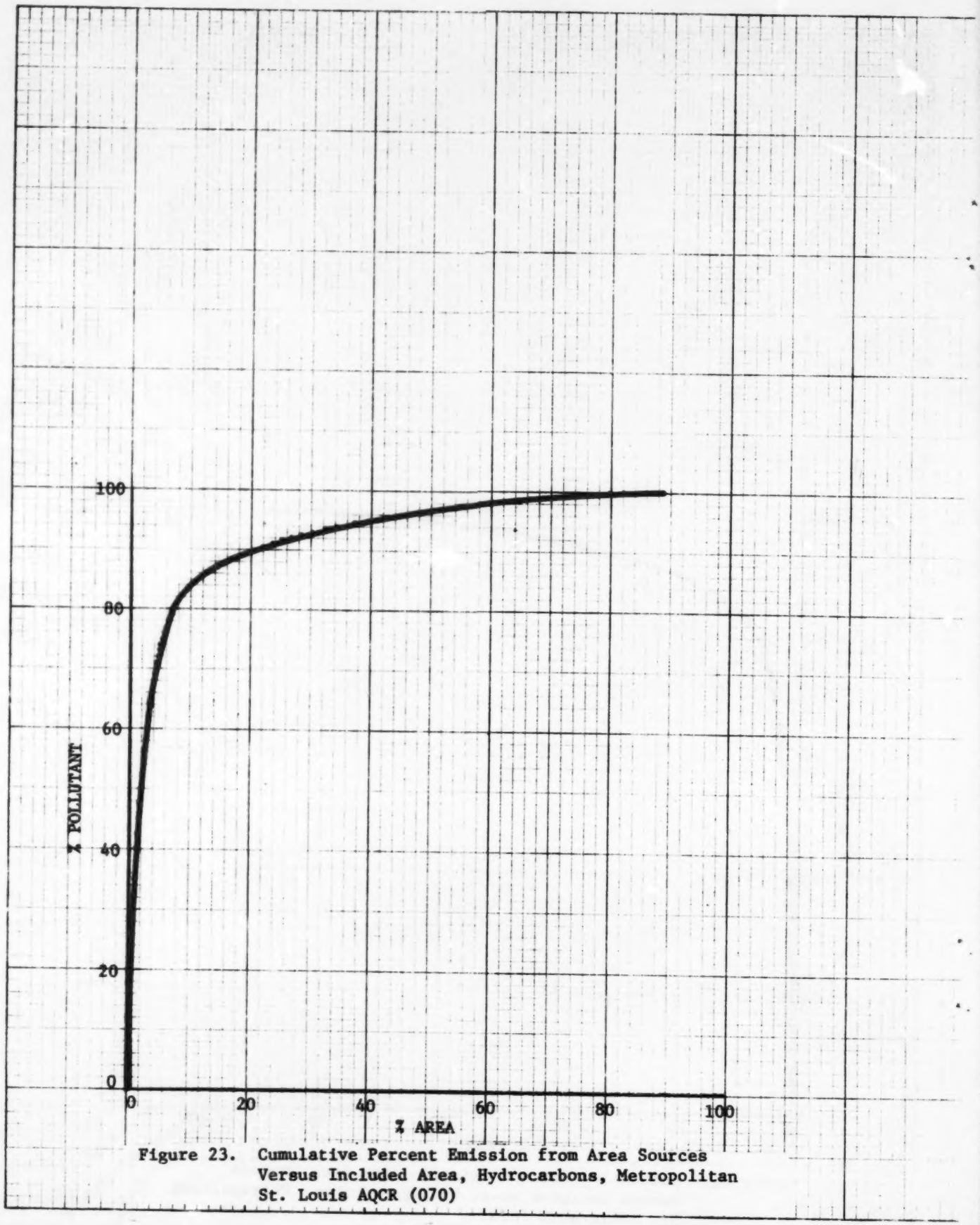

Figure 23. Cumulative Percent Emission from Area Sources Versus Included Area, Hydrocarbons, Metropolitan St. Louis AQCR (070)

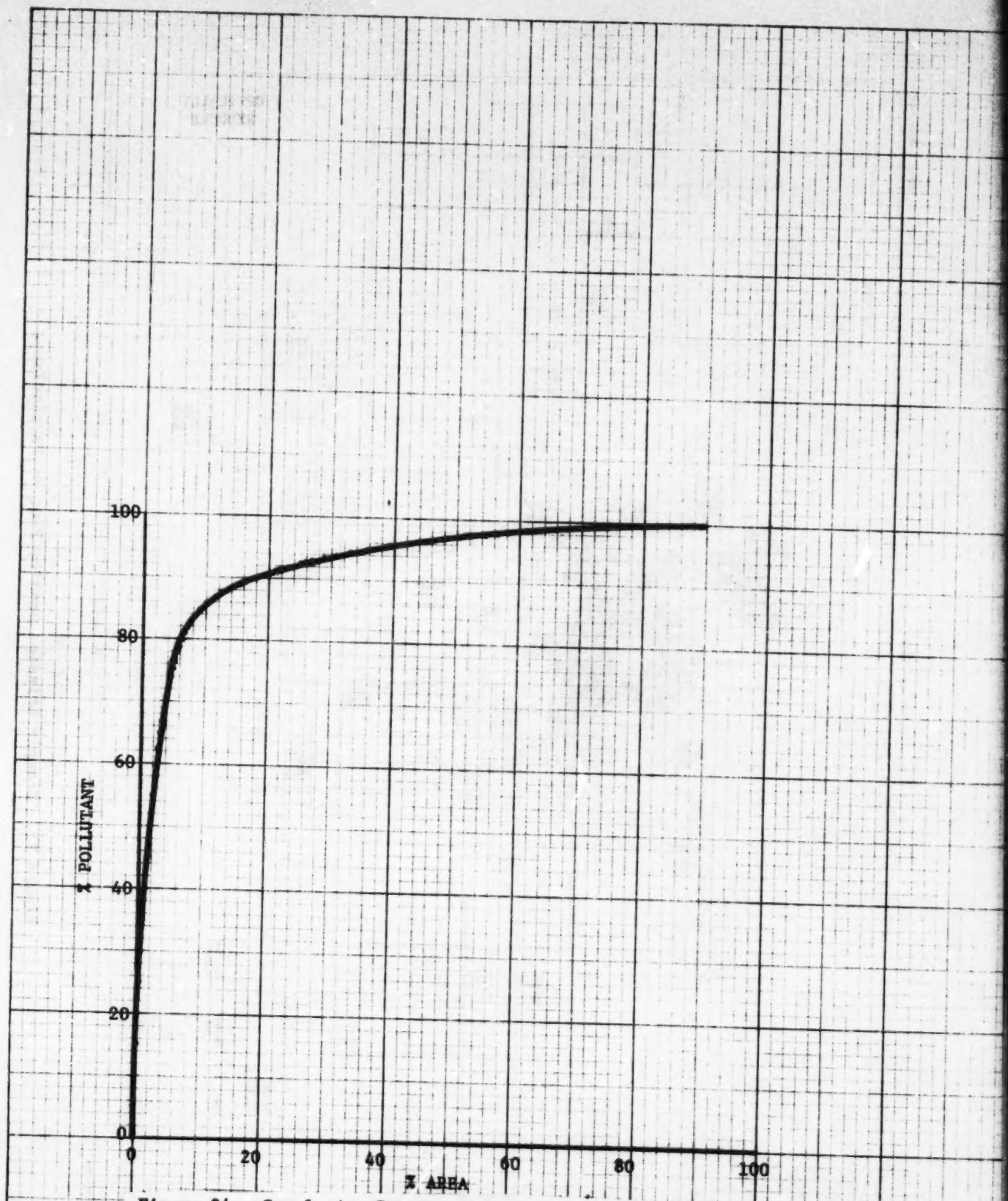

Figure 24. Cumulative Percent Emission from Area Sources Versus Included Area, Carbon Monoxide, Metropolitan St. Louis AQCR (070)

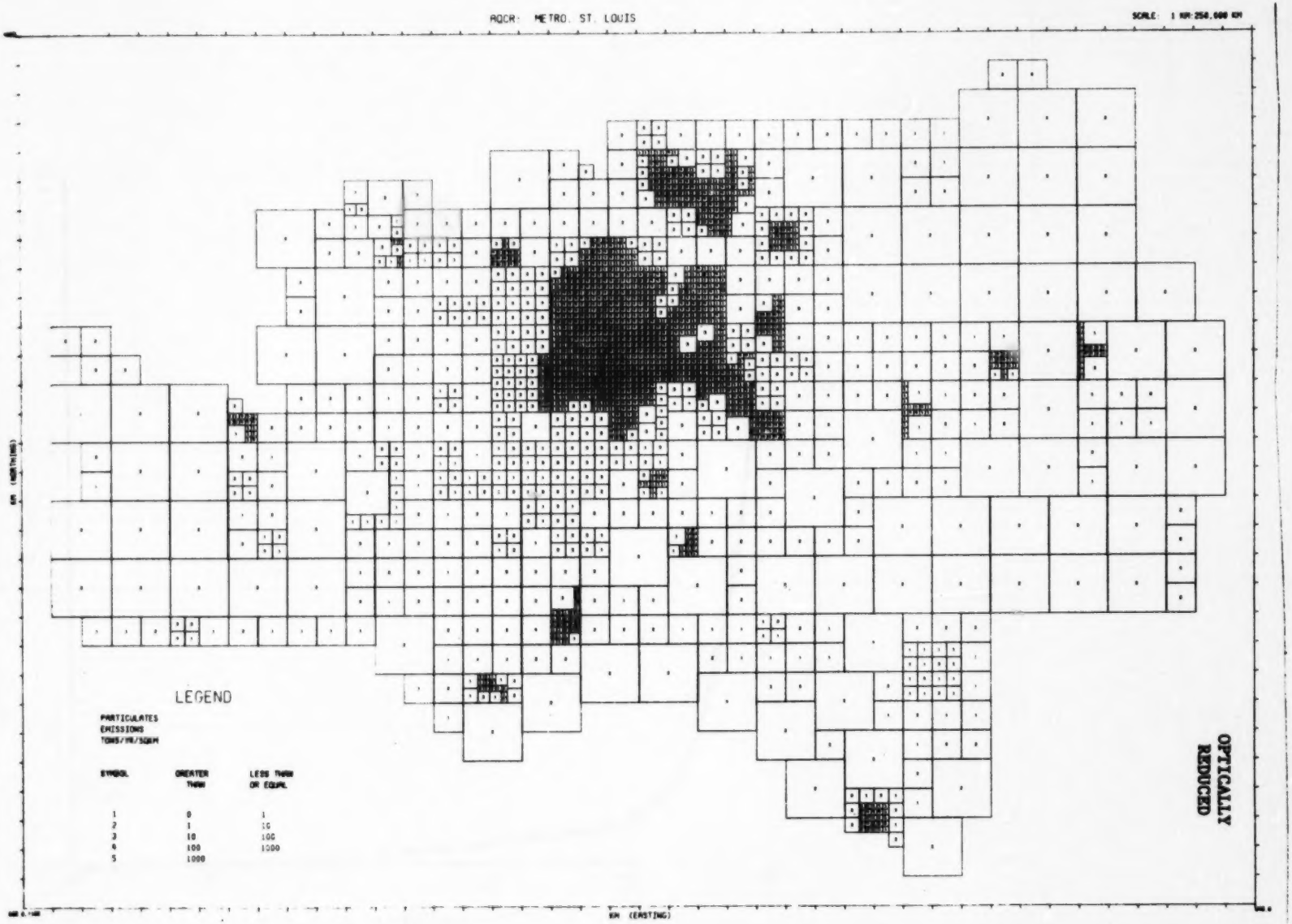

Figure 25. Example Emission Density Plot — Particulates

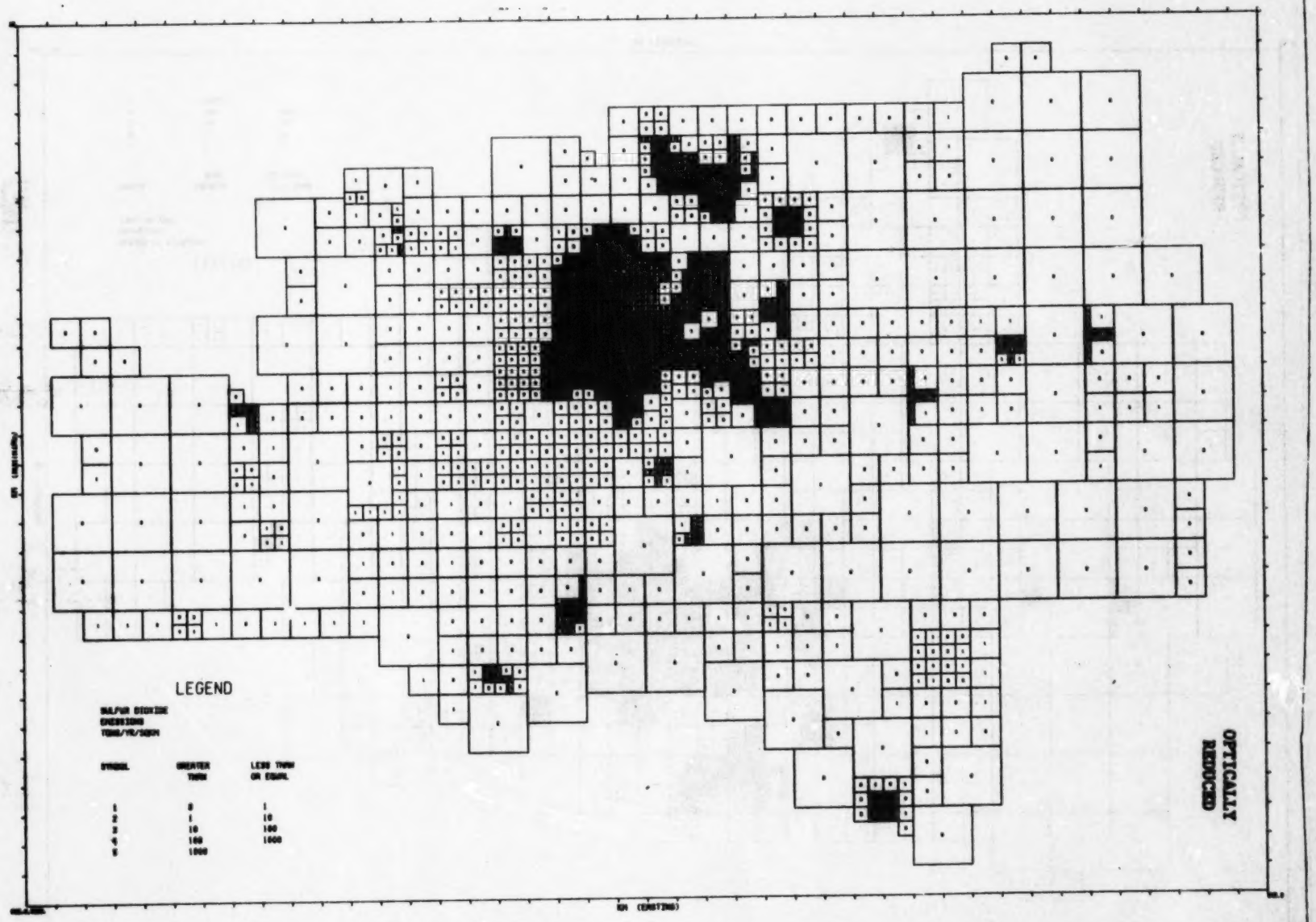

Figure 26. Example Emission Density Plot — Sulfur Dioxide

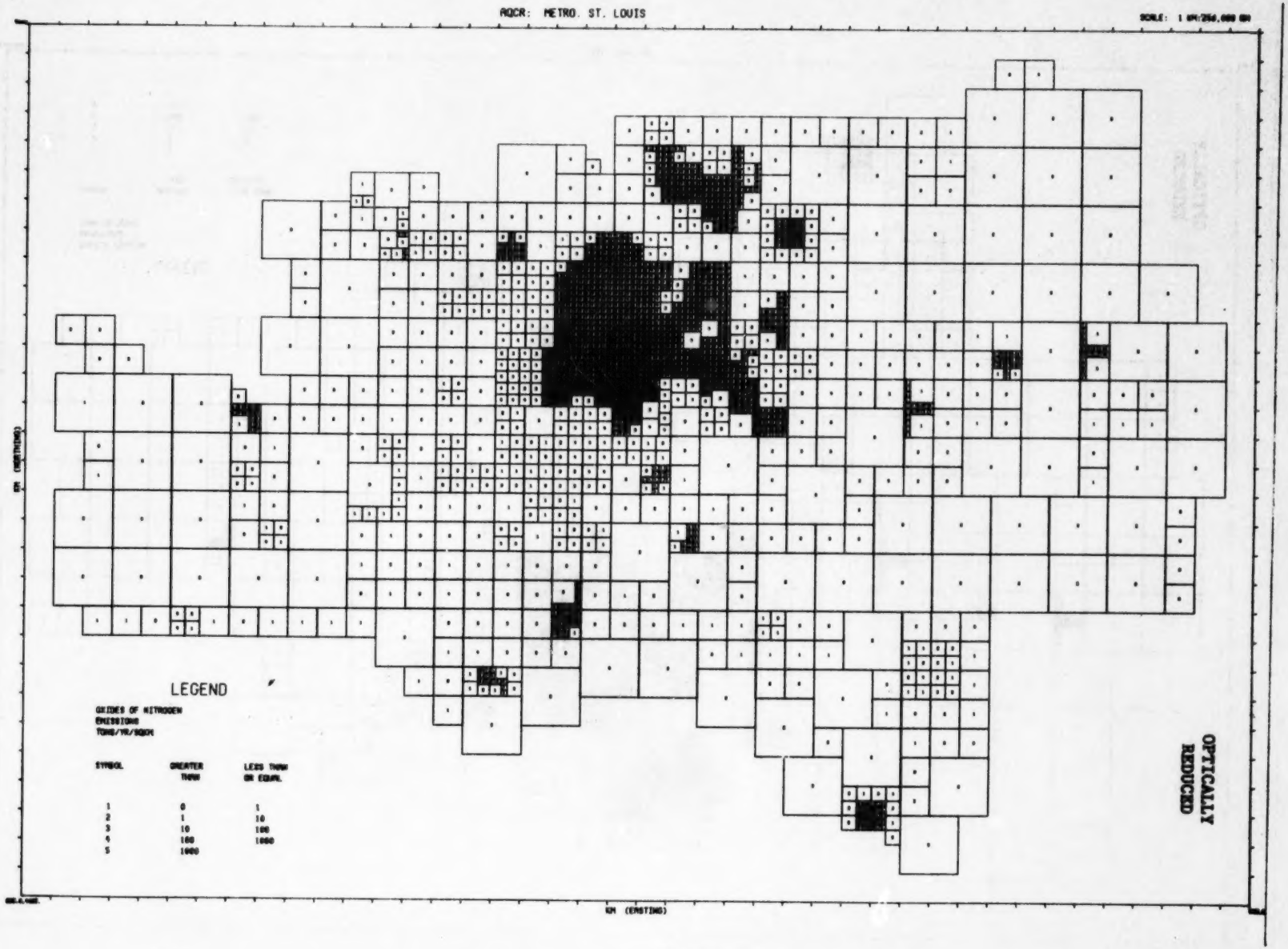

Figure 27. Example Emission Density Plot — Oxides of Nitrogen

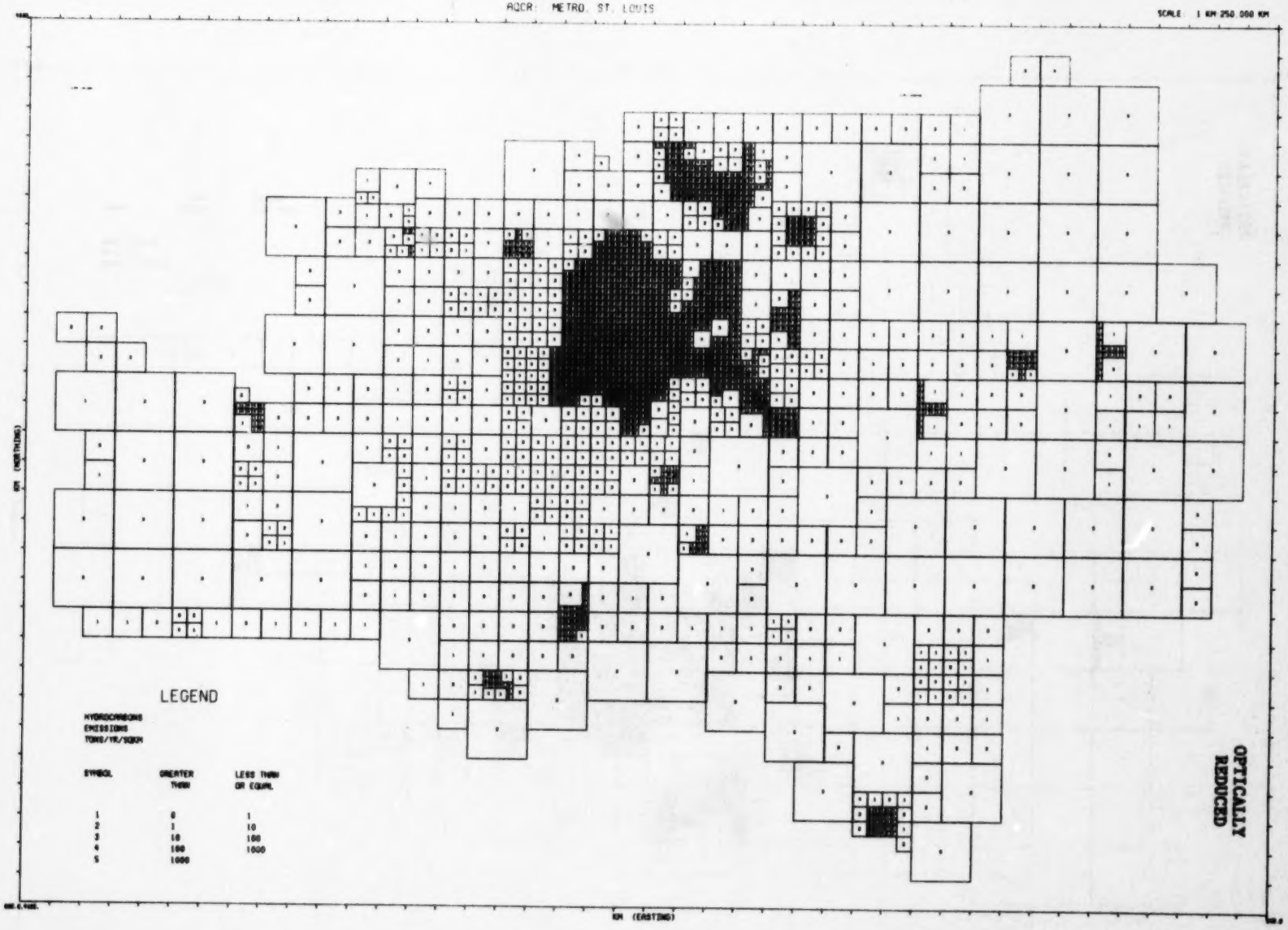

Figure 28. Example Emission Density Plot — Hydrocarbons

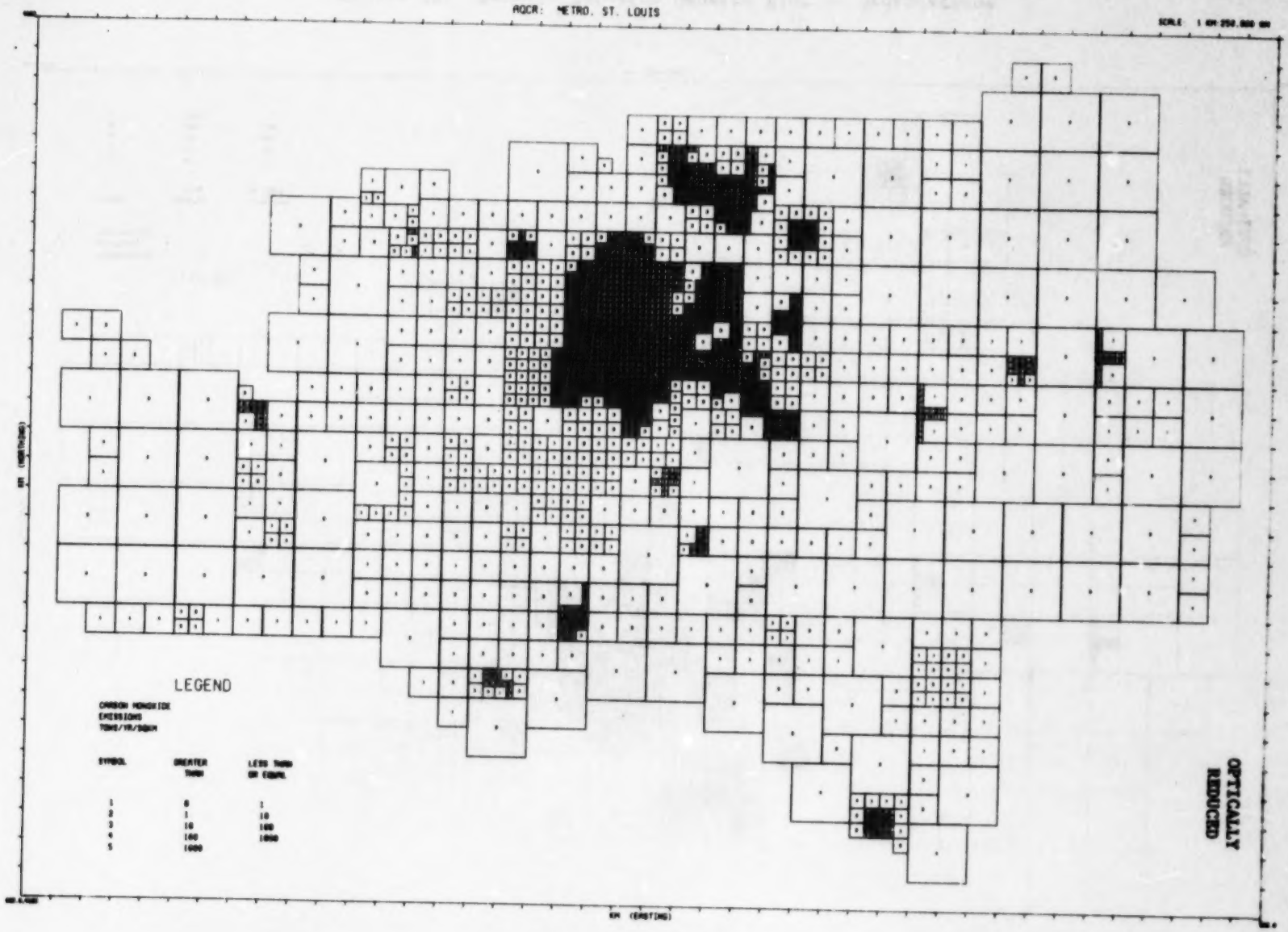

Figure 29. Example Emission Density Plot — Carbon Monoxide

AQCR IS METRO. ST. LOUIS PRIMARY UTM ZONE IS 15 PAGE 1

GRID SQUARES RANK ORDERED ON "EMISSION DENSITY" FOR PARTICULATE

ID	COUNTY	STATE	UTM EASTING	UTM NORTHING	AREA SQ.KM.	EMISSIONS (TONS/YR) AREA	EMISSIONS (TONS/YR) POINT	TOTAL EMISSIONS	TOTAL EMISSIONS/SQ.KM.
1224	MADS	IL	750.0	4286.0	1.0	0.0	213075.000	213075.000	213075.000
1167	MADS	IL	748.0	4305.0	1.0	0.0	34690.500	34690.500	34690.500
1055	CLAR	IL	746.0	4275.0	1.0	4.742	8787.500	8792.242	8792.242
1074	MADS	IL	745.0	4284.0	1.0	0.730	5901.500	5902.227	5902.227
958	LOUI	MO	742.0	4276.0	1.0	119.355	4211.000	4330.352	4330.352
1332	MADS	IL	753.0	4302.0	1.0	0.0	3198.500	3198.500	3198.500
1300	MADS	IL	752.0	4306.0	1.0	64.105	1890.000	1954.105	1954.105
1648	RAND	IL	777.5	4288.5	1.0	0.0	1274.500	1274.500	1274.500
1200	MADS	IL	749.0	4309.0	1.0	3.285	1265.000	1268.285	1268.285
1364	MADS	IL	754.0	4302.0	1.0	0.0	1211.500	1211.500	1211.500
633	LOCY	MO	732.5	4285.0	6.3	45.675	7566.000	7611.675	1208.154
1007	LOUI	MO	743.0	4283.0	1.0	61.685	994.500	1056.185	1056.185
1067	MADS	IL	745.0	4307.0	1.0	24.090	883.000	907.090	907.090
1513	CLAR	IL	761.0	4267.0	1.0	32.485	736.500	768.985	768.985
942	LOCY	MO	741.0	4290.0	1.0	10.220	683.500	693.720	693.720
815	LOUI	MO	738.0	4288.0	1.0	20.440	656.500	676.940	676.940
1122	CLAR	IL	747.0	4279.0	1.0	2.920	651.000	653.920	653.920
1050	MADS	IL	744.0	4309.0	1.0	13.505	547.000	560.505	560.505
924	LOCY	MO	729.0	4292.0	1.0	474.135	0.0	474.135	474.135
1135	MADS	IL	747.0	4307.0	1.0	5.840	452.500	458.340	458.340
957	LOUI	MO	742.0	4275.0	1.0	138.700	267.000	405.700	405.700
886	CLAR	IL	740.0	4285.0	9.0	11.315	3032.000	3043.315	404.513
675	LOCY	MO	734.0	4280.0	1.0	15.695	358.000	373.695	373.695
986	LOUI	MO	742.0	4284.0	1.0	93.805	256.000	349.805	349.805
757	LOUI	MO	736.0	4281.0	1.0	291.270	0.0	291.270	291.270
1063	CLAR	IL	745.0	4285.0	25.0	14.965	6639.000	6653.965	266.158
712	LOUI	MO	735.0	4275.0	1.0	259.880	0.0	259.880	259.880
982	LOUI	MO	742.0	4280.0	1.0	258.420	0.0	258.420	258.420
759	LOUI	MO	736.0	4283.0	1.0	216.810	29.000	245.810	245.810
854	LOUI	MO	739.0	4275.0	1.0	243.455	0.0	243.455	243.455
751	LOUI	MO	736.0	4275.0	1.0	233.235	0.0	233.235	233.235
898	LOUI	MO	740.0	4281.0	1.0	231.410	0.0	231.410	231.410
750	LOUI	MO	736.0	4274.0	1.0	217.905	0.0	217.905	217.905
856	LOUI	MO	739.0	4277.0	1.0	217.905	0.0	217.905	217.905
670	LOUI	MO	734.0	4275.0	1.0	216.810	0.0	216.810	216.810
830	LOUI	MO	738.0	4283.0	1.0	216.970	0.0	216.970	216.970
934	LOUI	MO	741.0	4282.0	1.0	207.320	0.0	207.320	207.320
794	LOUI	MO	737.0	4283.0	1.0	199.290	0.0	199.290	199.290
893	LOUI	MO	740.0	4276.0	1.0	198.925	0.0	198.925	198.925
1127	MADS	IL	747.0	4286.0	1.0	36.865	162.000	198.865	198.865
928	LOUI	MO	741.0	4276.0	1.0	198.560	0.0	198.560	198.560
861	LOUI	MO	739.0	4282.0	1.0	198.195	0.0	198.195	198.195
793	LOUI	MO	737.0	4282.0	1.0	196.735	0.0	196.735	196.735
859	LOUI	MO	739.0	4280.0	1.0	196.735	0.0	196.735	196.735
497	JEFF	MO	729.0	4233.0	1.0	4.015	188.500	192.515	192.515

Figure 30. Listing of Grid Squares Rank Ordered on Density of Total Emissions for AQCR 070

LOCATION OF POINT SOURCES FOR METRO. ST. LOUIS

POINT SOURCE NUMBER	1	IS LOCATED IN GRID SQUARE NUMBER	1761
POINT SOURCE NUMBER	2	IS LOCATED IN GRID SQUARE NUMBER	1761
POINT SOURCE NUMBER	3	IS LOCATED IN GRID SQUARE NUMBER	1761
POINT SOURCE NUMBER	4	IS LOCATED IN GRID SQUARE NUMBER	1761
POINT SOURCE NUMBER	5	IS LOCATED IN GRID SQUARE NUMBER	1818
POINT SOURCE NUMBER	6	IS LOCATED IN GRID SQUARE NUMBER	1782
POINT SOURCE NUMBER	7	IS LOCATED IN GRID SQUARE NUMBER	1781
POINT SOURCE NUMBER	8	IS LOCATED IN GRID SQUARE NUMBER	1781
POINT SOURCE NUMBER	9	IS LOCATED IN GRID SQUARE NUMBER	1715
POINT SOURCE NUMBER	10	IS LOCATED IN GRID SQUARE NUMBER	1715
POINT SOURCE NUMBER	11	IS LOCATED IN GRID SQUARE NUMBER	1715
POINT SOURCE NUMBER	12	IS LOCATED IN GRID SQUARE NUMBER	1818
POINT SOURCE NUMBER	13	IS LOCATED IN GRID SQUARE NUMBER	1818
POINT SOURCE NUMBER	14	IS LOCATED IN GRID SQUARE NUMBER	1818
POINT SOURCE NUMBER	15	IS LOCATED IN GRID SQUARE NUMBER	1818
POINT SOURCE NUMBER	16	IS LOCATED IN GRID SQUARE NUMBER	1768
POINT SOURCE NUMBER	17	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	18	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	19	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	20	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	21	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	22	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	23	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	24	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	25	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	26	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	27	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	28	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	29	IS LOCATED IN GRID SQUARE NUMBER	1167
POINT SOURCE NUMBER	30	IS LOCATED IN GRID SQUARE NUMBER	1167

Figure 31. Listing of Grid Square Placement of Each Point Source in AQCR 070

AQCR 15 METRO. ST. LOUIS

OTHER ZONE	X-COORDINATE	Y-COORDINATE	COUNTY	PRIMARY ZONE	X-COORDINATE	Y-COORDINATE
16	280.5	4284.1	CLNT	15	802.9	4286.8
16	280.9	4284.1	CLNT	15	802.9	4286.8
16	280.9	4284.1	CLNT	15	802.9	4286.8
16	280.9	4284.1	CLNT	15	802.9	4286.8
16	294.7	4275.1	CLNT	15	817.2	4278.8
16	280.5	4276.5	CLNT	15	802.9	4279.2
16	280.1	4276.0	CLNT	15	802.6	4278.7
16	280.1	4276.0	CLNT	15	802.6	4278.7
16	283.0	4268.0	CLNT	15	786.0	4269.6
16	283.0	4268.0	CLNT	15	786.0	4269.6
16	283.0	4268.0	CLNT	15	786.0	4269.6
16	294.7	4275.1	CLNT	15	817.2	4278.8
16	294.7	4275.1	CLNT	15	817.2	4278.8
16	294.7	4275.1	CLNT	15	817.2	4278.8
16	294.7	4275.1	CLNT	15	817.2	4278.8
16	278.2	4270.4	CLNT	15	801.1	4273.0
16	267.1	4292.2	MADS	15	788.5	4294.0
16	267.1	4292.2	MADS	15	788.5	4294.0
16	267.1	4292.2	MADS	15	788.5	4294.0
16	267.7	4292.5	MADS	15	789.1	4294.4
16	267.7	4292.5	MADS	15	789.1	4294.4
16	267.7	4292.5	MADS	15	789.1	4294.4
16	239.4	4266.6	MADS	15	762.6	4266.7
16	239.4	4266.6	MADS	15	762.6	4266.7
16	250.2	4231.7	RAND	15	775.6	4232.5
16	250.2	4231.7	RAND	15	775.6	4232.5
16	250.2	4231.7	RAND	15	775.6	4232.5
16	250.2	4231.7	RAND	15	775.6	4232.5
16	250.2	4231.7	RAND	15	775.6	4232.5
16	254.3	4197.6	RAND	15	781.9	4198.8
16	254.3	4197.6	RAND	15	781.9	4198.8
16	254.3	4197.6	RAND	15	781.9	4198.8
16	254.3	4197.6	RAND	15	781.9	4198.8
16	250.2	4199.7	RAND	15	777.7	4200.6
16	250.2	4199.7	RAND	15	777.7	4200.6
16	250.2	4199.7	RAND	15	777.7	4200.6
16	250.4	4199.6	RAND	15	777.9	4200.5
16	250.4	4199.6	RAND	15	777.9	4200.5
16	250.4	4199.6	RAND	15	777.9	4200.5
16	250.4	4199.6	RAND	15	777.9	4200.5
16	250.4	4199.6	RAND	15	777.9	4200.5
16	251.9	4199.8	RAND	15	779.4	4200.8
16	251.9	4199.8	RAND	15	779.4	4200.8
16	251.0	4269.5	CLAR	15	774.0	4270.3
16	251.0	4269.5	CLAR	15	774.0	4270.3
16	251.0	4269.5	CLAR	15	774.0	4270.3
16	251.0	4269.5	CLAR	15	774.0	4270.3
16	251.0	4269.5	CLAR	15	774.0	4270.3
16	251.0	4269.5	CLAR	15	774.0	4270.3
16	251.0	4269.5	CLAR	15	774.0	4270.3
16	239.5	4266.0	CLAR	15	762.7	4266.1
16	239.9	4268.4	CLAR	15	763.0	4268.5
16	248.5	4246.0	CLAR	15	773.0	4246.7
16	255.2	4263.1	CLAR	15	778.6	4264.2
16	255.2	4263.1	CLAR	15	778.6	4264.2
16	255.2	4263.1	CLAR	15	778.6	4264.2
16	255.2	4263.1	CLAR	15	778.6	4264.2
16	255.2	4263.1	CLAR	15	778.6	4264.2
16	255.2	4263.1	CLAR	15	778.6	4264.2

Figure 32. List of Transferred Point Sources for AQCR 070